Appendix A

Calibrations and Logistics for Field Sampling

The six hi-volume samplers were recalibrated at AIHL using the orifice plate technique. Immediately following this, the samplers were evaluated for equivalency by sampling for seven 24-hour periods and determining total suspended particulate (TSP). Figure A-1 shows the positioning of the samplers for this work. Sampler locations were altered, as shown, to minimize bias due to locations. The results of this study are given in Table A-1. For the seven sampling days the mean coefficient of variation between the six samplers was 4.8% with a mean TSP of 34 $\mu g/m^3$. The results for the six hi-vol samplers were judged sufficiently equal to permit reliable field sampling.

A problem was experienced with the flow meter in Instrument No. 4 at Riverside used for 2-hour samples. Flow readings on this instrument were approximately 30 units compared to 50 at Berkeley. Table A-2 summarizes the behavior of all instruments used. Results from Instrument 4, a 2-hour sampler, were clearly anomalous if values around 30 are assumed to be correct. The resulting apparent 14-hour TSP measurements were approximately three times those from the 14-hour sampler adjacent to it. However, the actual weight of material on the 2-hour filters from hi-vol No. 4 was similar to those at other sites sampling at the same time, suggesting the instrument really was sampling close to same flow as in Berkeley.

Two assumptions were tested to serve as the basis for correcting the flow data from hi-vol No. 4:

Assumption A: Assume hi-vol No. 4 behaves like units 1, 6, 2, and 5. Then No. 4 should have read about 4 units higher than in Berkeley.

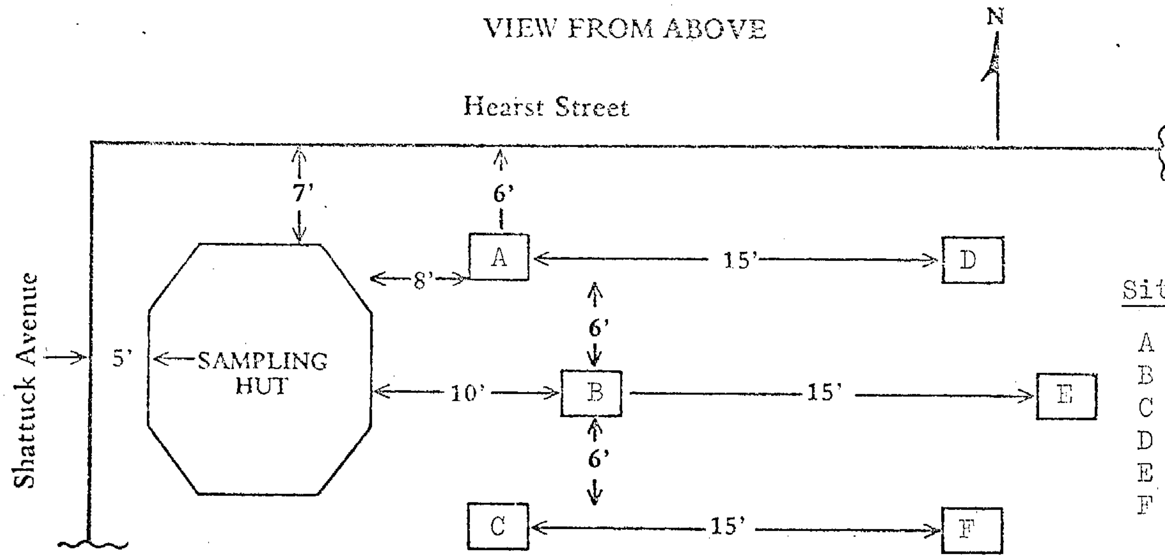
Assumption B: Assume hi-vol No. 4 behaves like No. 3. Then No. 4 should have read about 10 units higher than in Berkeley.

Using Assumptions A and B, flows were calculated and the resulting 14-hour concentration calculated from seven 2-hour filters and compared to those observed.

Site	14-hour obs/14-hour calc TSP
Pasadena	0.72
Pomona	0.77
Riverside - Assumption A	0.66
Riverside - Assumption B	0.78

Since it is plausible that artifact $SO_4^=$ causes some of the discrepancy between calculated and observed TSP and that such effects should be lower in Riverside because of lower SO_2, we conclude that Assumption B is more nearly correct. All concentrations from samples obtained on Instrument No. 4 were calculated accordingly, but their absolute values must be considered less reliable than those from the other samples.

VIEW FROM ABOVE



Site	Sampler Arrangement Plan I	Plan II
A	2	4
B	1	5
C	3	6
D	4	2
E	5	1
F	6	3

VIEW FROM SIDE LOOKING SOUTH

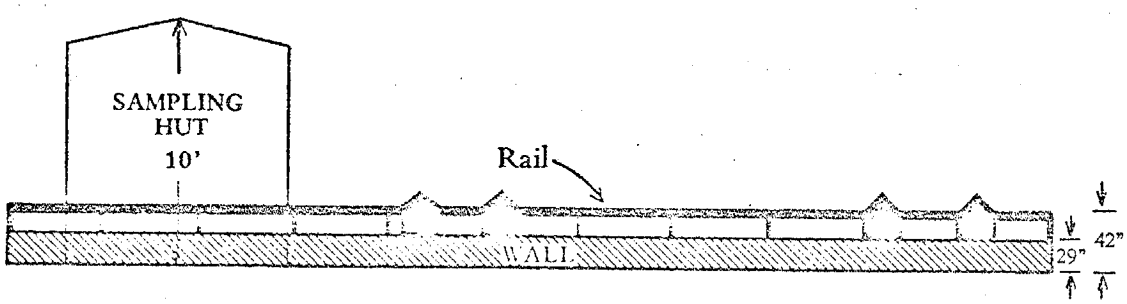


Figure A-1. Arrangement of High Volume Air Samplers on Roof of the State Health Department.

SOURCE: STATE OF CALIFORNIA
DEPARTMENT OF HEALTH
AIR AND INDUSTRIAL HYGIENE
LABORATORY, BERKELEY

Table A-1

OBSERVED VALUES OF TOTAL SUSPENDED PARTICULATE IN 24-HOUR SAMPLING ($\mu g/m^3$)

Plan	Trial	Sampler Number 1	2	3	4	5	6	Mean	C.V.☆☆ (%)
I	1	28.07	30.90	27.75	30.46	30.59	28.98	29.5 ± 1.4	4.6
I	2	49.20	47.76	45.48	49.19	49.93	48.37	48.3 ± 1.6	3.3
I	3	31.61	30.29	28.12	29.13	29.40	27.94	29.4 ± 1.4	4.7
II	4	26.5	26.7	24.6	26.9	27.1	23.4	25.9 ± 1.5	5.8
II	5	27.1	27.1	25.7	26.4	28.5	27.7	27.1 ± 1.0	3.6
II	6	49.6	49.6	44.8	44.6	52.7	51.8	48.8 ± 3.4	7.1
I	7	33.12	31.57	29.19	32.07	31.44	---☆	31.5 ± 1.4	4.6

☆Sampler 6 not admissable for comparison for this trial due to timer problems.

☆☆Coefficient of variation.

Table A-2

COMPARISON OF HI-VOL FLOW METER READINGS IN BERKELEY AND AT FIELD SITE

Inst. No.	Ave. Flow Reading[a] Berkeley	Field	ΔFlow	Field Location
1	48.5	53.25	+ 4.75	Pasadena
6	40.0	44.5	+ 4.50	Pasadena
2	47.5	51.5	+ 4.00	Pomona
5	37.0	41.0	+ 4.00	Pomona
3	46.0	56.5	+10.5	Riverside
4	48.0	30.0	-18.0	Riverside

a. Average of initial and final flow readings.

The DASIBI analyzers at Pasadena and Pomona were calibrated according to ARB's UV procedure. At Riverside, the REM chemiluminescent ozone analyzer was calibrated against 2% neutral buffered KI at the request of the Riverside staff. The resulting O_3 values are approximately 22% higher than values expected by the ARB UV procedure.* Accordingly, all O_3 values from Riverside were multiplied by 0.78.

Filters were packaged in aluminum foil lined manila folders to minimize carbon contamination. These, in turn, were inserted in manila envelopes. Immediately vollowing sampling, loaded filters, packaged as described, were placed in closed polyethylene bags and immediately frozen. Samples were subsequently transferred to a cold room maintained at $\leq 5°C$ until completion of the study. Samples were transported to AIHL over dry ice and stored at -10°C until ready for analysis.

A set of instructions for sampler operators is included at the end of this Appendix.

*D. Grosjean, private communication.

INSTRUCTIONS FOR FIELD PERSONNEL

Carbonaceous Material Characterization Study

1. Sampling is being conducted at three locations:

   a. Cal Tech on roof of Keck Lab., Pasadena

   b. Roof of Pomona station of LAAPCD, 924 North Garey, Pomona

   c. Top of ARB trailer adjacent to the Fawcett Lab., U.C. Riverside

2. At each sampling location there are two hi-vol samplers to be used for sampling on each of eight sampling days. Each sampler is identified by a number from 1-6. One of them will sample continuously from 0700 hours PDT (7:00 a.m.) to 2100 hours (9:00 p.m.) and the second, with two hour filter changes as follows:

   0700-0900 Pacific Daylight Time
   0900-1100
   1100-1300
   1300-1500
   1500-1700
   1700-1900
   1900-2100

   If one of the two units is equipped with a recorder, this instrument will be used for the 14-hour sample.

3. Sampling will be conducted on July 8, 9, 10 and 11th. Four more sampling days will be selected during the following two weeks based upon the previous days smog forecast.

Jerry Sprung, Statewide Air Pollution Research Laboratory, (714) 787-3549, will obtain air pollution forecasts and will contact Jim Dudziak in Pasadena, (213) 796-9543, and Steve Heisler, (213) 795-6841, Ext. 1383 or 1389, who is in charge of Cal Tech's own sampling program the preceding evening if the following day is to be a sampling day.

4. Filters are packaged in aluminum foil lined folders. Each is pre-numbered on the filter edge and on the envelope. The envelope also includes a station, episode and filter type designation:

W X YYYY HR

W = C (Pasadena)

P (Pomona)

R (Riverside)

X = A,B,C....indicating successive 14-hour episodes

YYYY = a four digit filter number

HR = an 8 x 10 glass fiber (Gelman type A/E) filter

As received in the field the episode designation is blank and must be filled in by the person changing filters.

Sample: R A 0128 HR

In this case the episode designation "A" is added to this and all other filters used on that day.

5. Filters should be handled lightly with clean hands (with gloves where hands will be dirty from climbing ladders) by the edges and installed with care, checking each filter for tears, holes etc. Any filter found to be damaged (except at the outer edge where it obviously will

not influence sampling or sealing of the filter) or which is dropped or otherwise contaminated should not be used. Defective filters should be so labelled on the outside of the envelope.

6. <u>14-hour sample</u>

Record episode designation on filter <u>envelope</u>, the complete filter designation in log book, load filter, place clean recorder sheet in position, refill ink, verify that pen writes, record data and episode designation on chart, with coin or screwdriver set chart for 0700. Have these steps complete at least several minutes before 0700. Switch on at 0700 recording actual time to the nearest minute in log book (see sample log sheet). Shut off at 2100 hours recording time off in log book. Read and record initial and final flow reading from chart and staple chart to back of that day's log sheet. Operator initials log sheet as shown.

7. <u>Two-hour sample (initial sample)</u>

Record episode designation on filter envelope and load filter. At 0700 hours, switch on. After five minutes (needed for warm-up) record visifloat value at center of ball and enter this, with starting time in log book. At end of sampling period note and record visifloat value, shut off time and replace filter with fresh one. (For subsequent samples warm-up period unnecessary).

8. <u>Removal and storage of loaded filters</u>

Filters with atmospheric particulate matter are to be kept in storage over dry ice or in a cold room at all times. After removing filter from hi-vol, replace in aluminum lined folder which, in turn, is inserted in an envelope and then into a large plastic bag kept sealed with a rubber band and then into cold storage. All filters from one day of sampling, including two-hour and 14-hour filters, go into the same plastic bag.

WARNING TO POMONA CREW: TRANSPORT DRY ICE CHEST IN TRUNK OF CAR AND HAVE WINDOWS OPEN AT ALL TIMES.

9. Return of filters and equipment to AIHL

After completion of sampling program, Art Alcocer will pick up (with assistance of field personnel) samplers and filters. The latter will be maintained at -80^{o}C for transport back to the lab.

10. Supplementary data

Pasadena

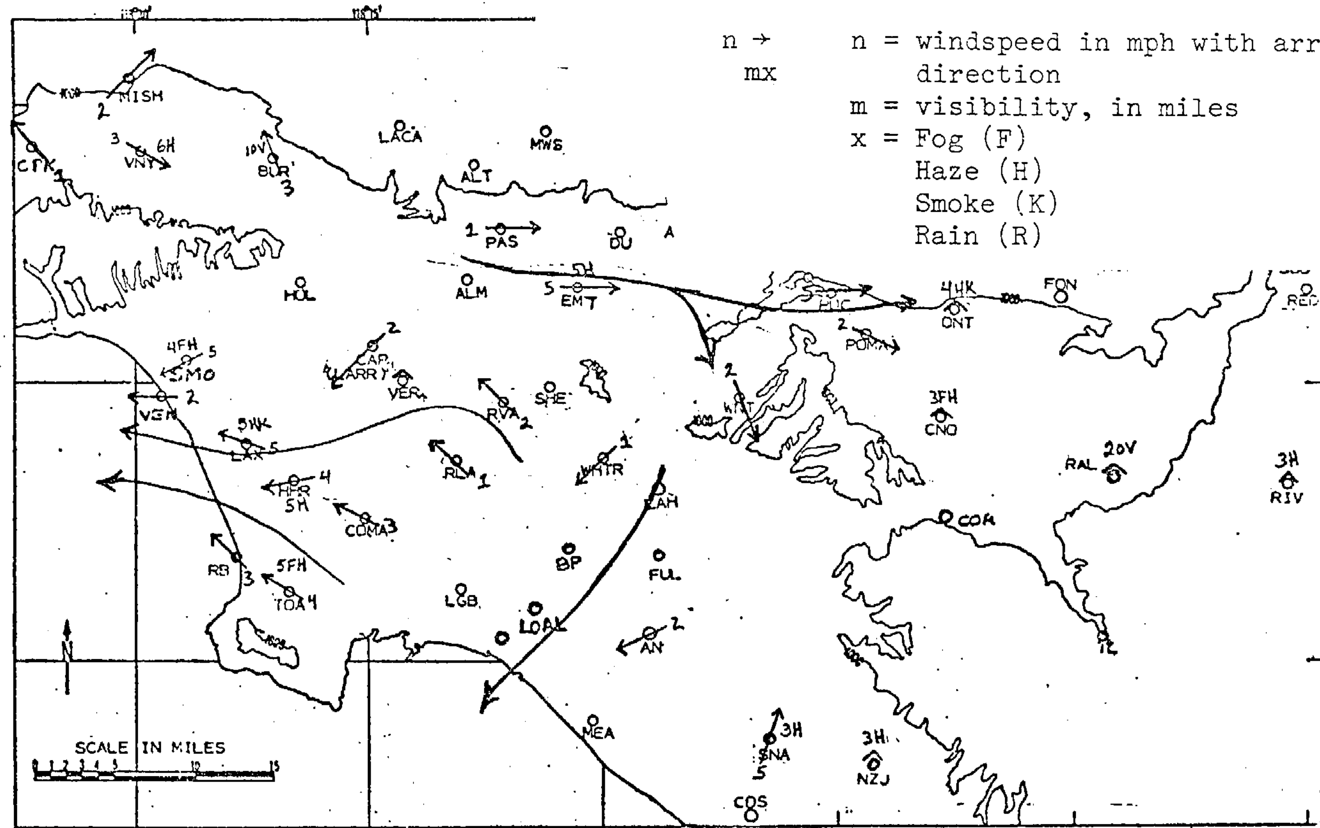
Jim Dudziak will calculate two-hour average ozone values from 60 instantaneous values printed out each two minutes. The two-hour periods will be the same as used for filter sampling. Steve Heisler will provide detailed instructions on reading these data from the ozone instrument. The O_3 data is recorded on the log sheet. Similarly Jim will calculate two-hour average b_{scat} values and record these in the log book. See sample log sheet.

11. Contacts for questions

Call collect either Bruce Appel or Art Alcocer at (415) 843-7900.

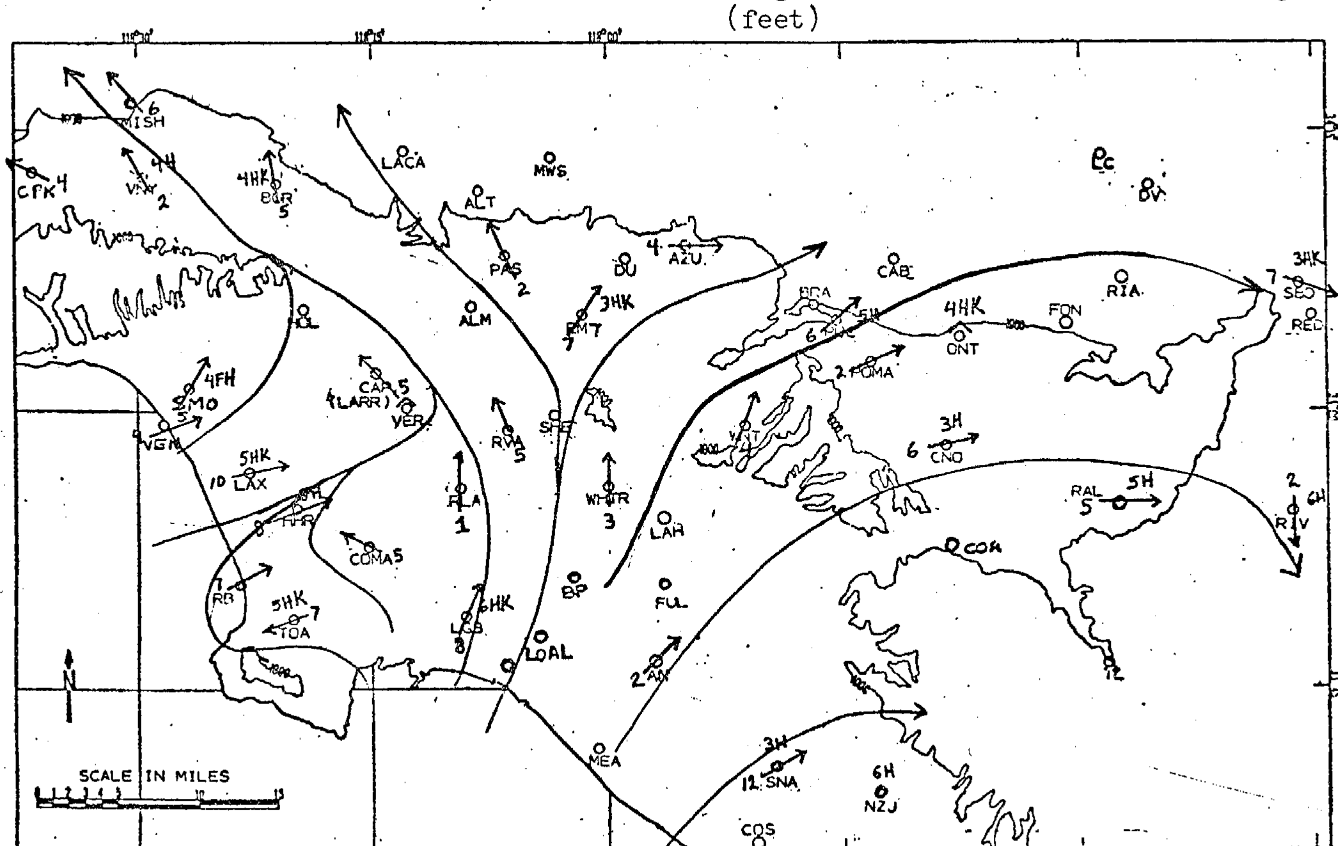
Key to Meteorological Data

n → n = windspeed in mph with arrow notin[g]
mx direction
m = visibility, in miles
x = Fog (F)
Haze (H)
Smoke (K)
Rain (R)



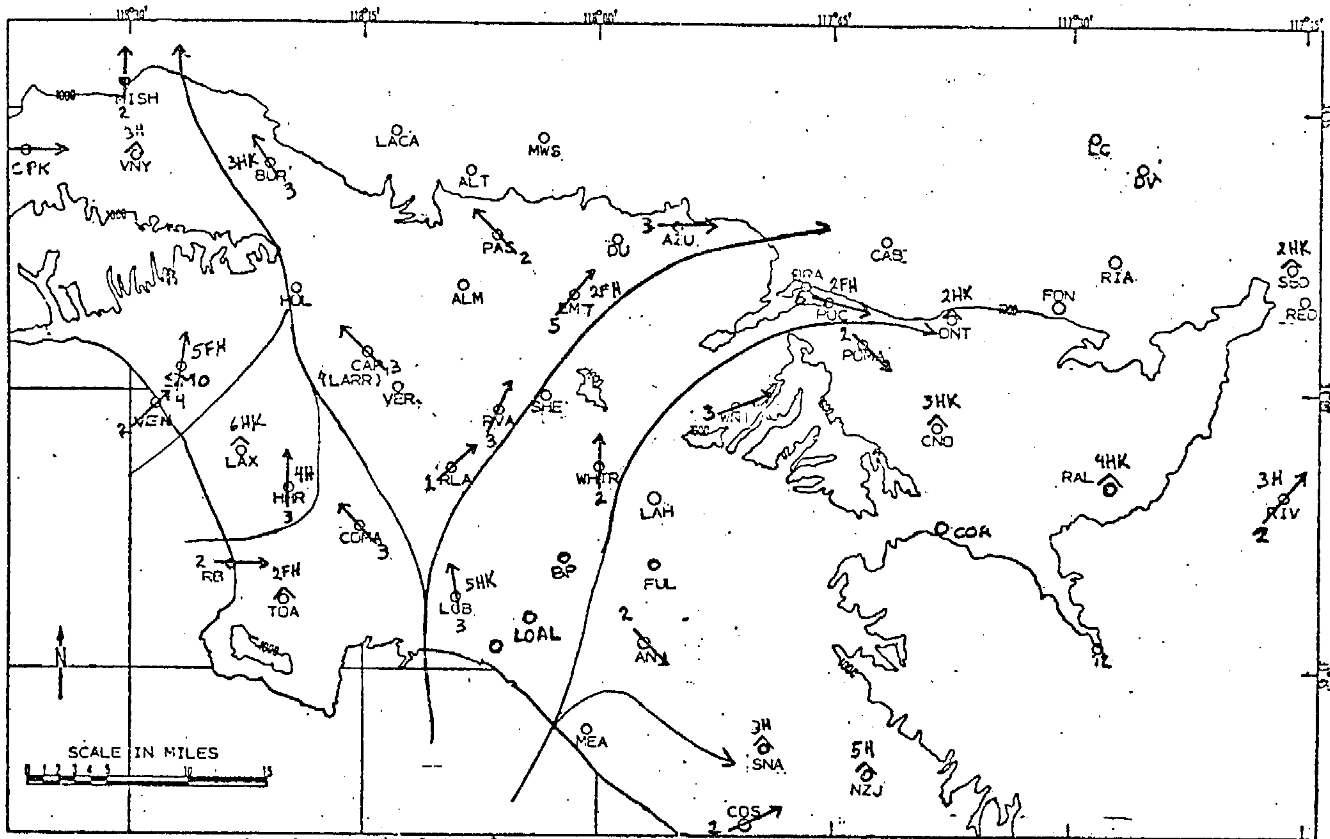
0800 PDT July 8, 1975

		Base Top	Strength
Inversion height: (feet)	LAX	1250-2920	strong
	EMT	1020-4110	strong



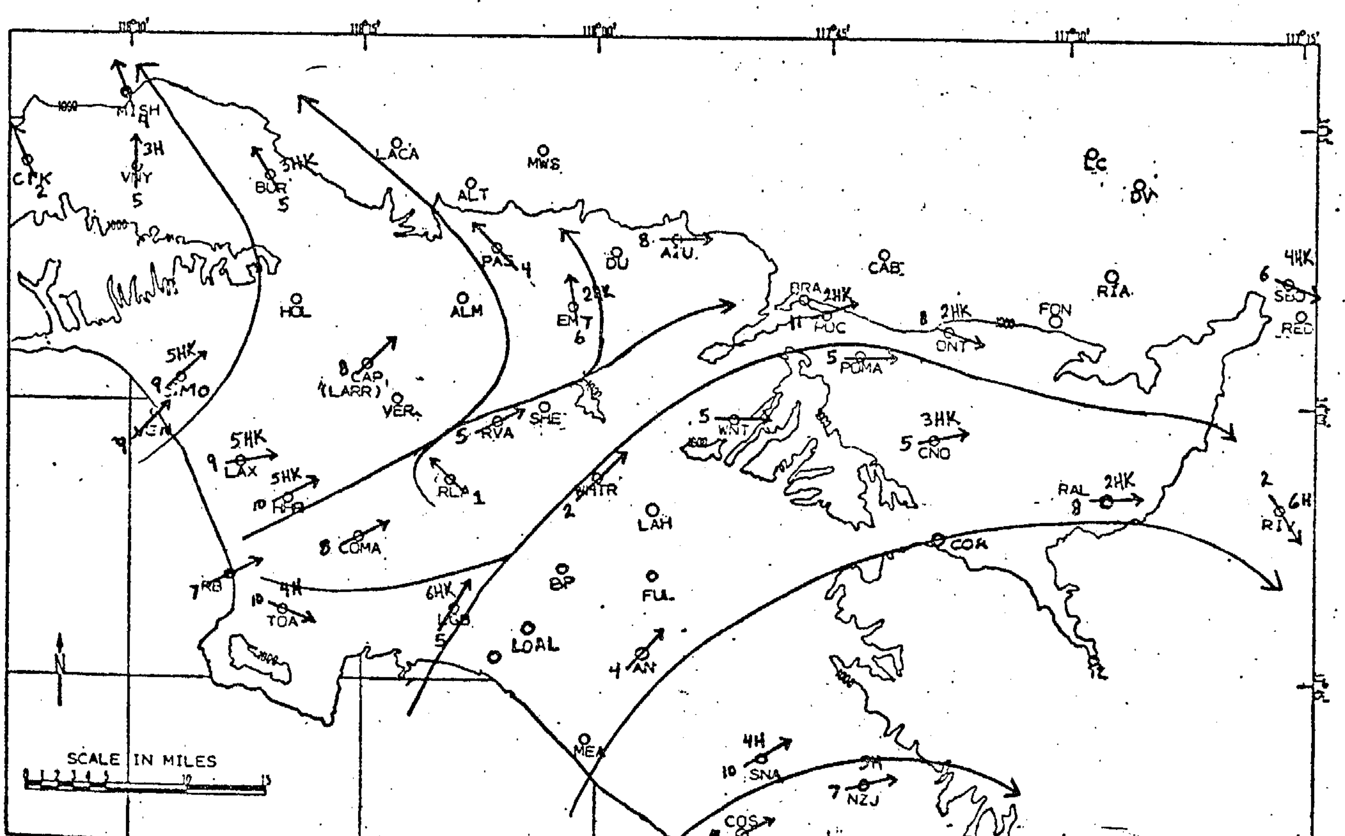
1200 PDT July 8, 1975

LAX	980-3330	strong
EMT	1670-3120	strong



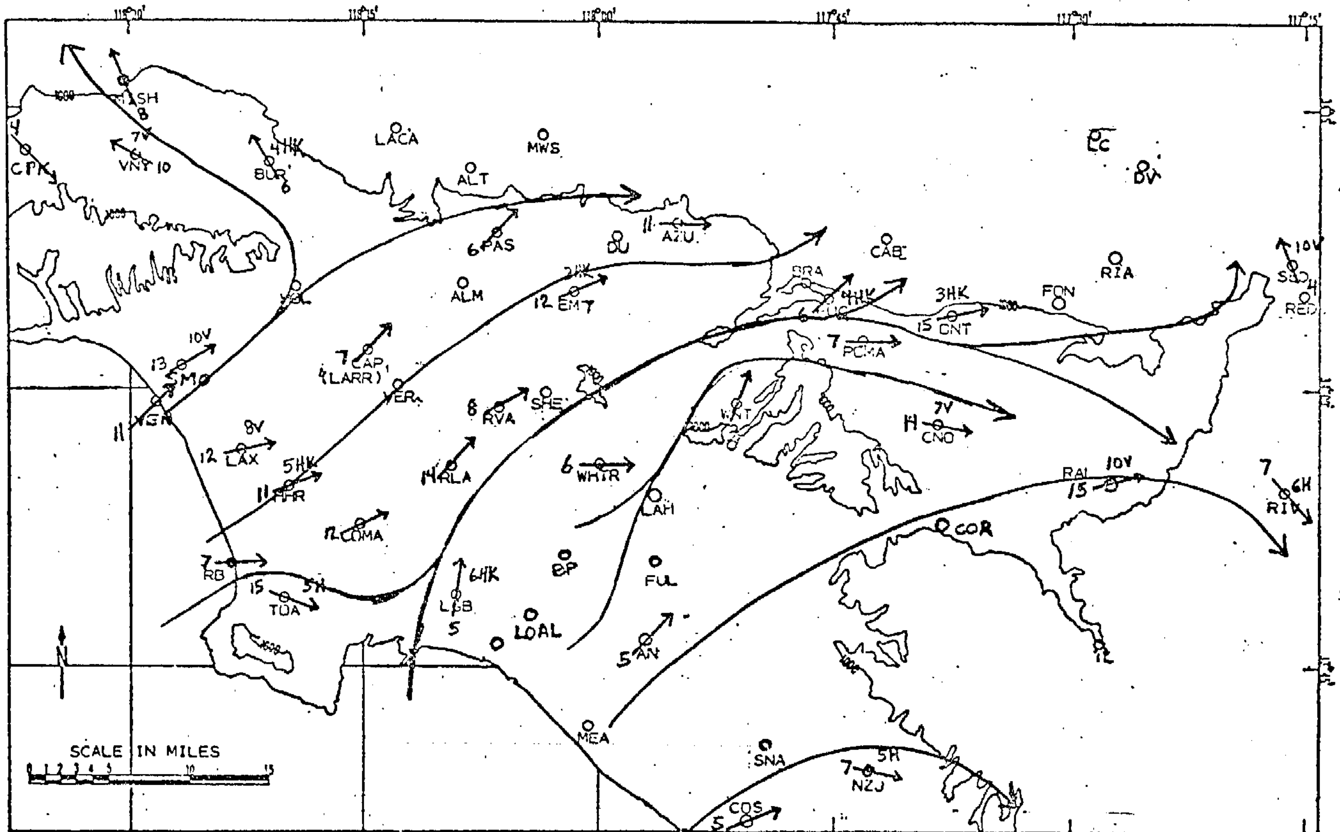
0800 PDT July 9, 1975

LAX	950-3020	strong
EMT	820-2490	strong



1200 PDT July 9, 1975

LAX	920-2560	strong
EMT	1800-2660	weakened



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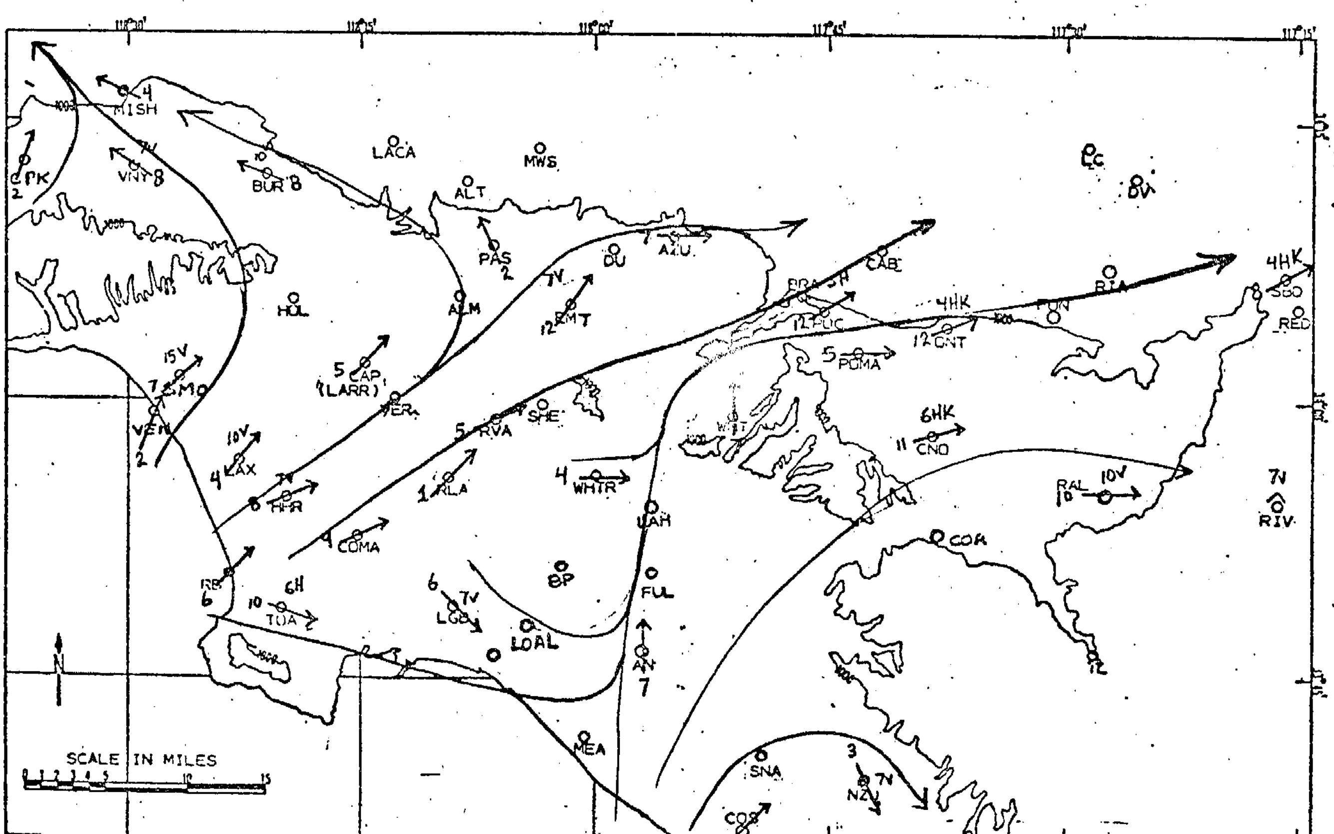
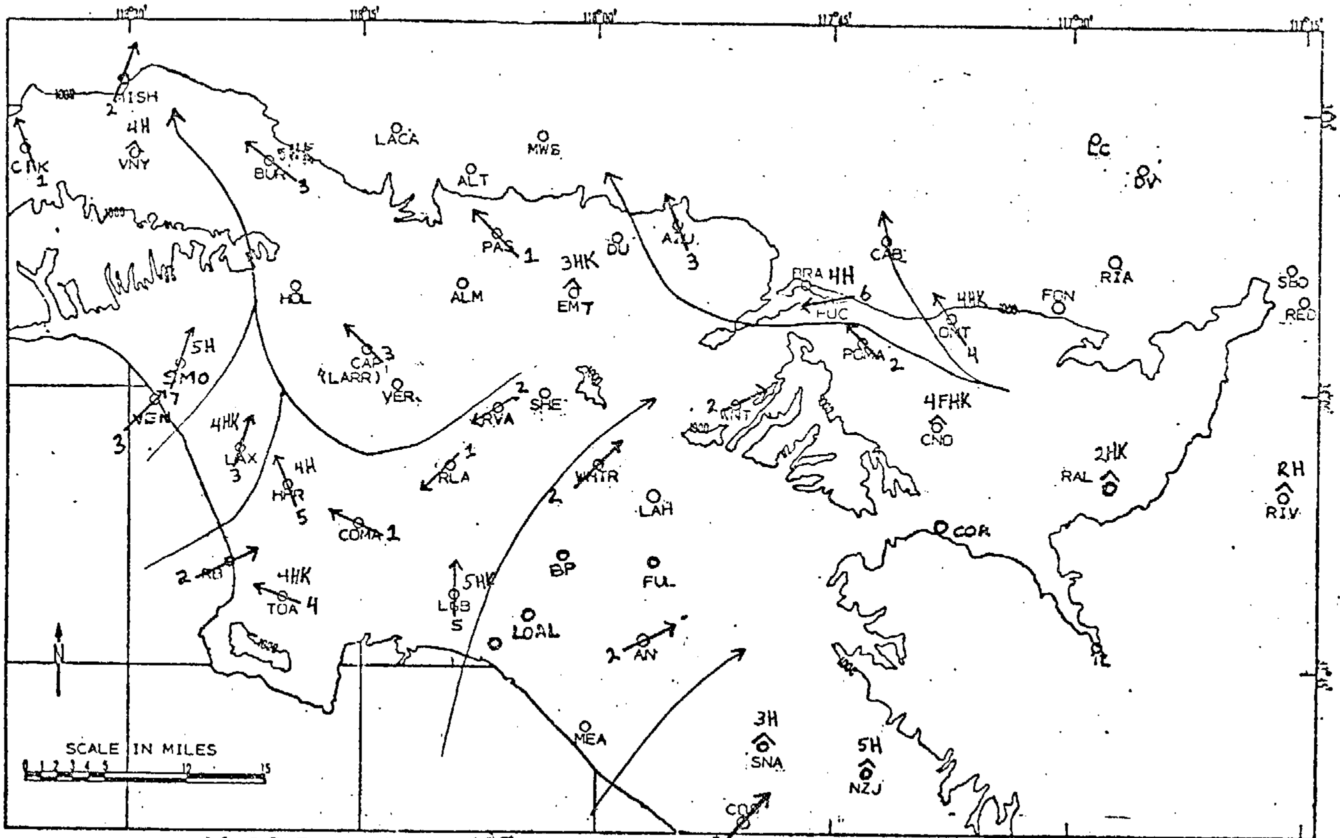
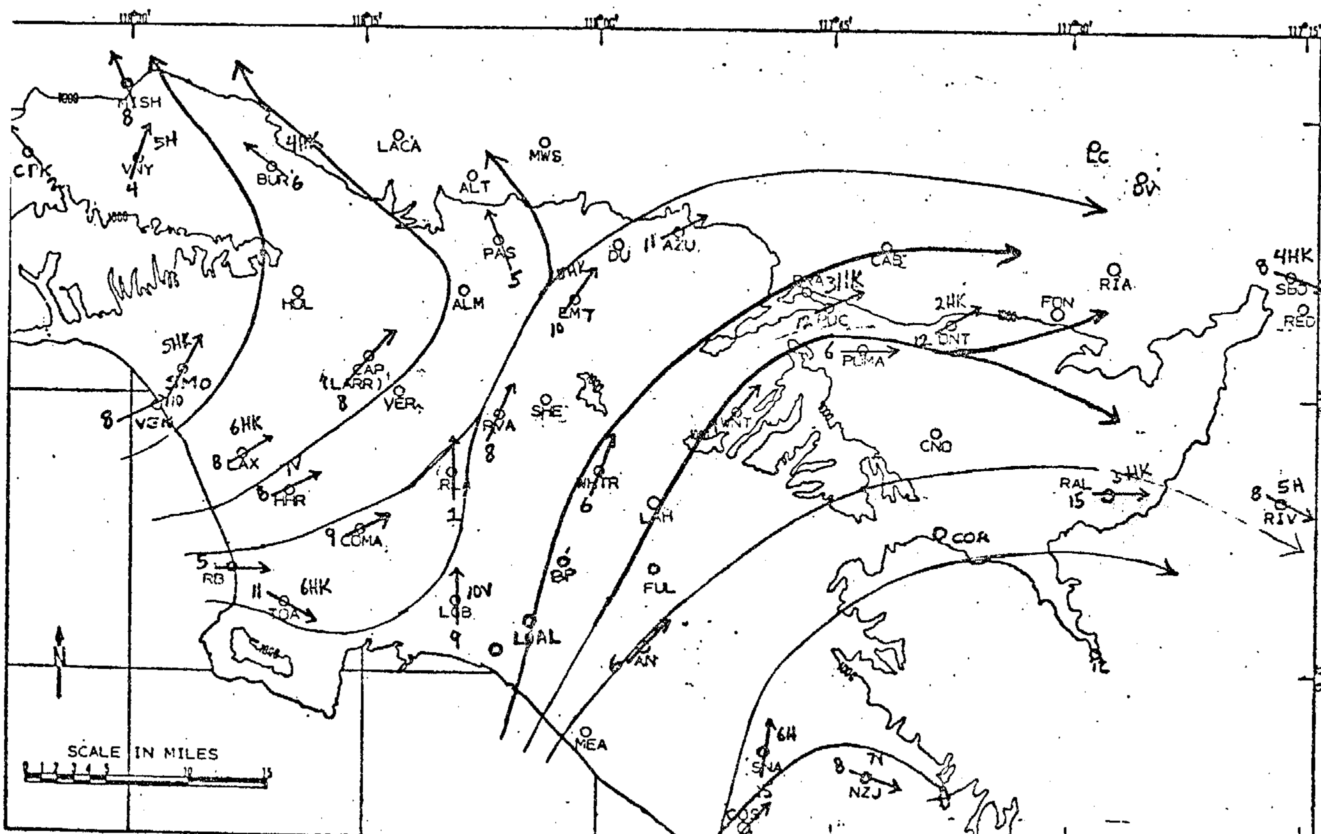


2000 PDT July 9, 1975



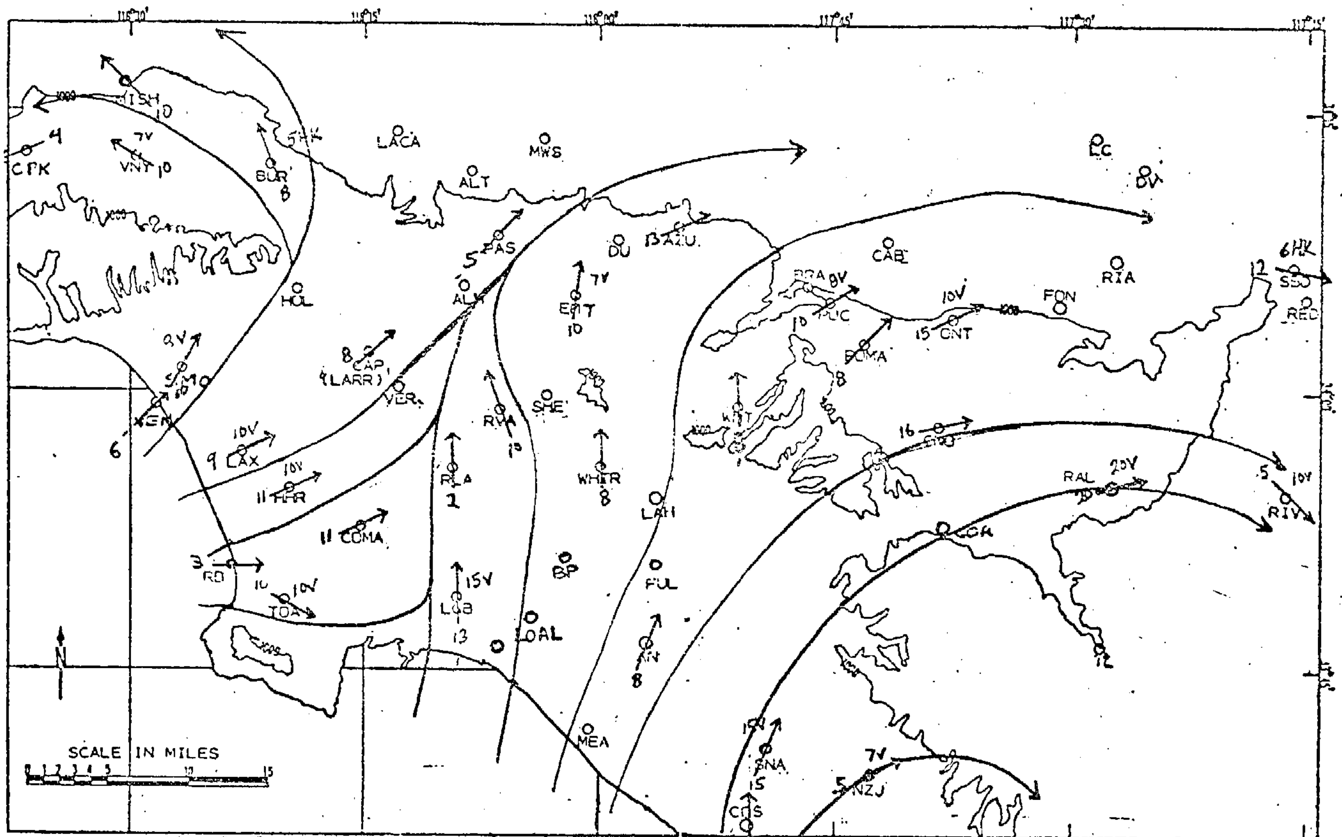
0800 PDT July 10, 1975

LAX	370	weak
EMT	850-2790	moderate



1200 PDT July 10, 1975

LAX	490-3540	moderate
EMT	2260-3080	weak



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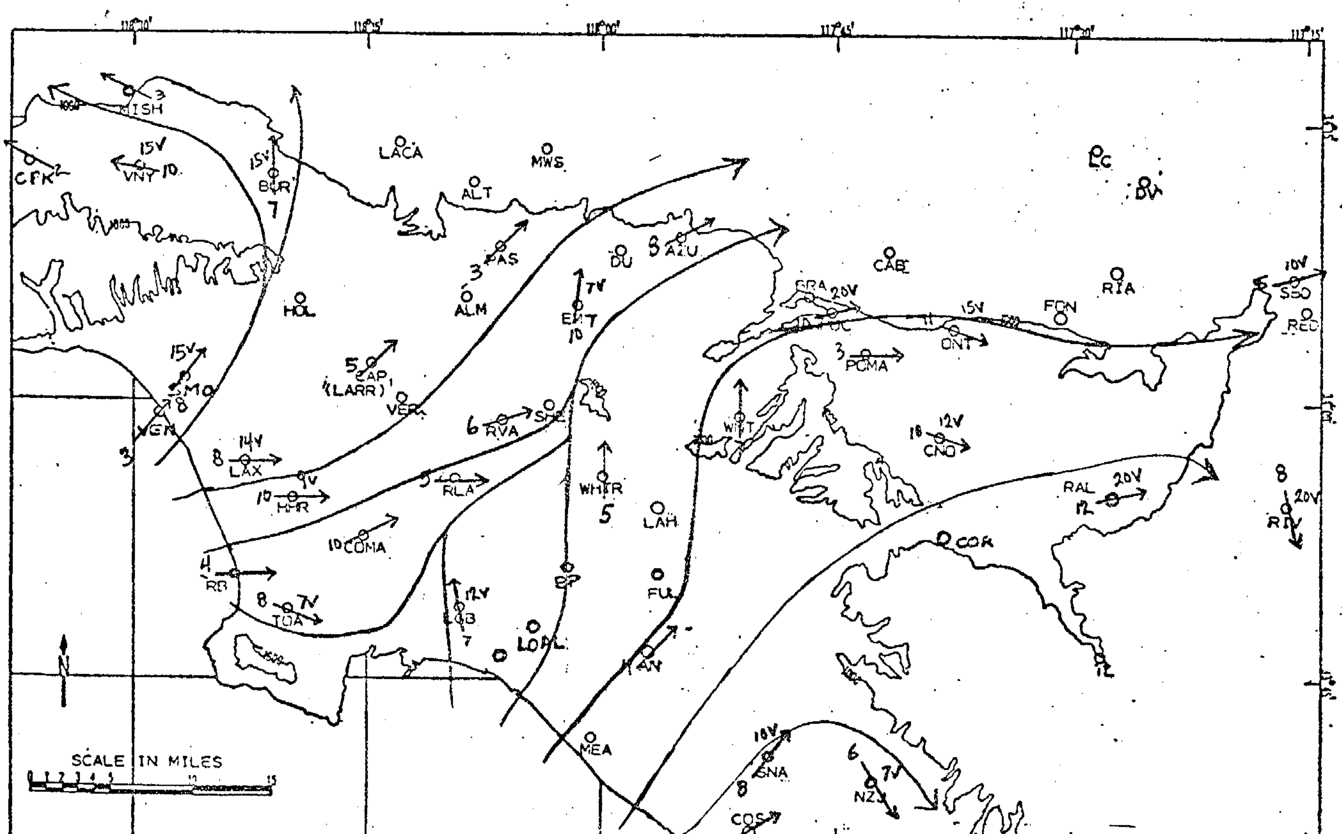

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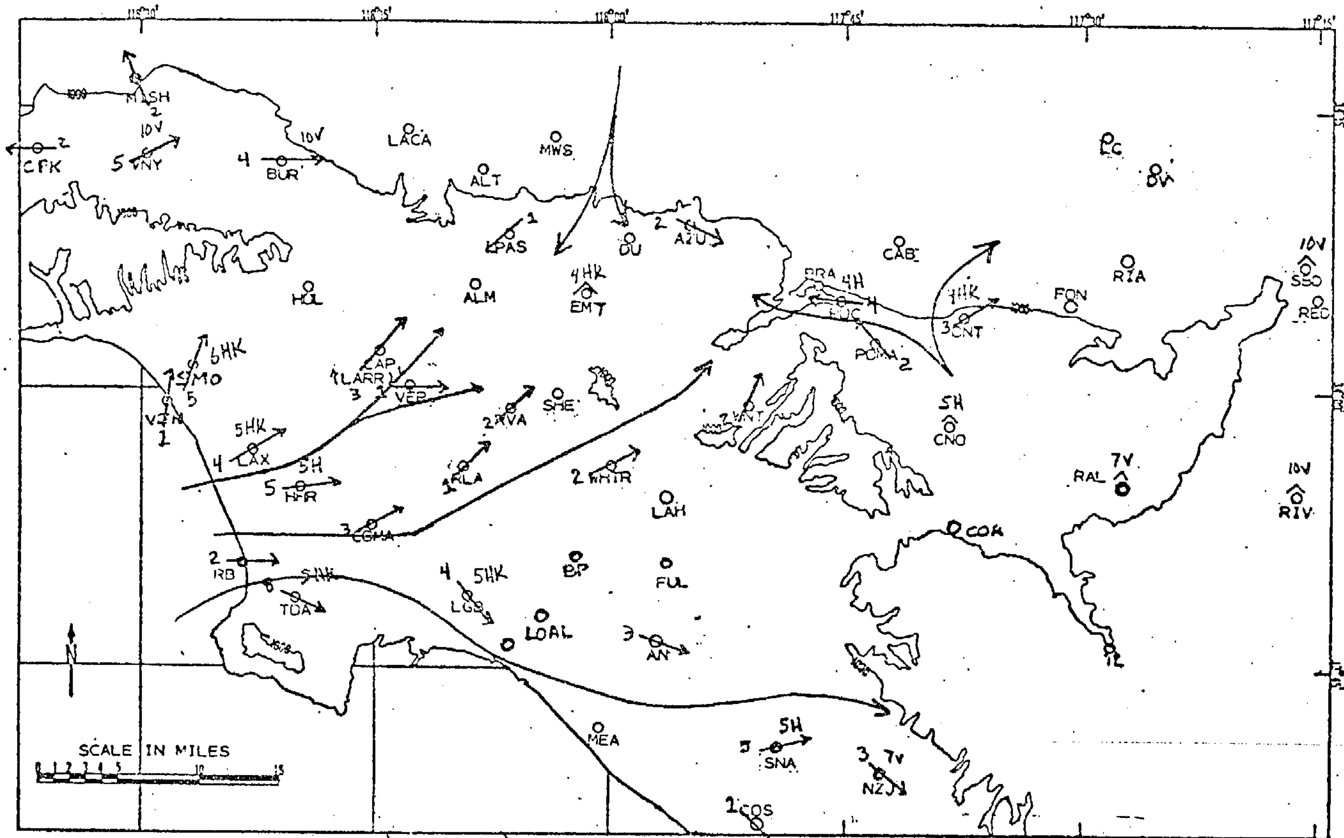
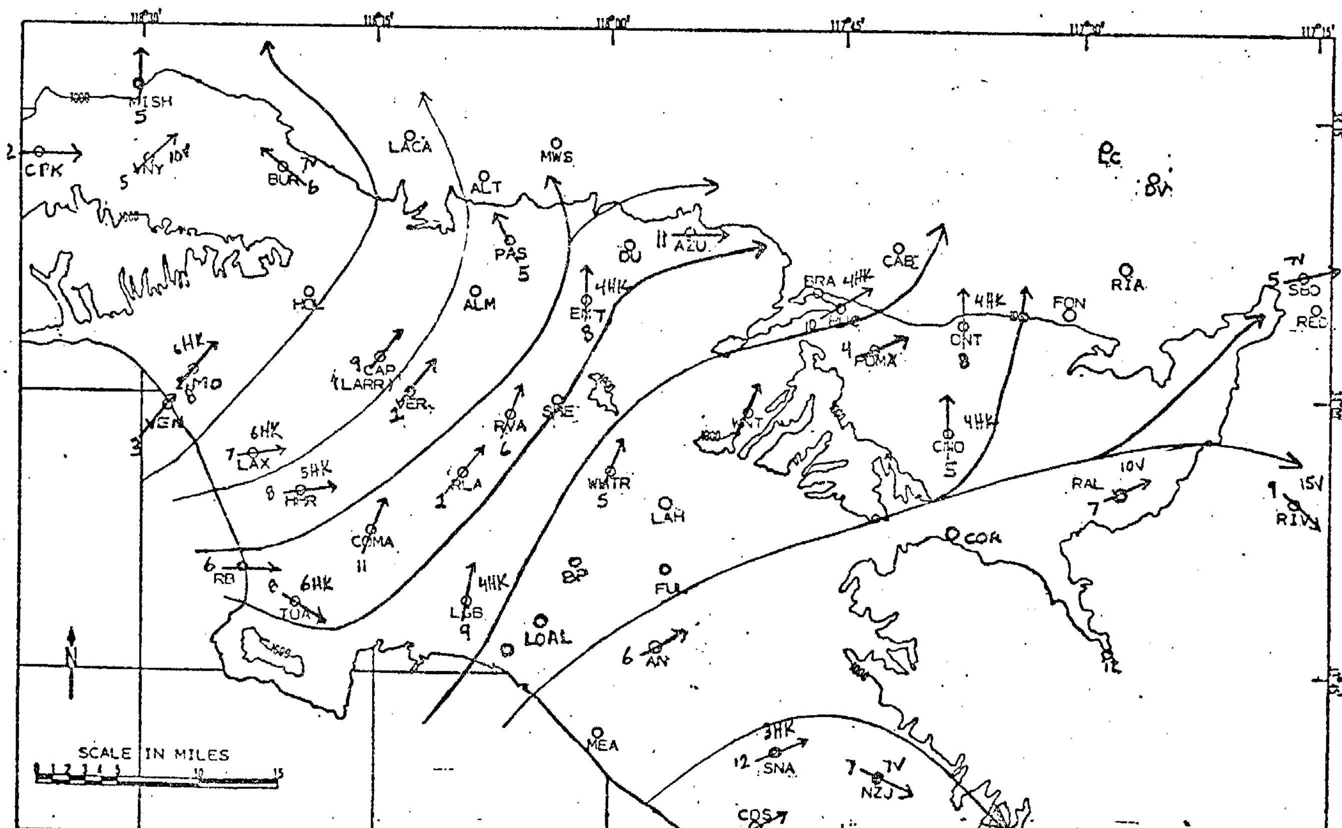


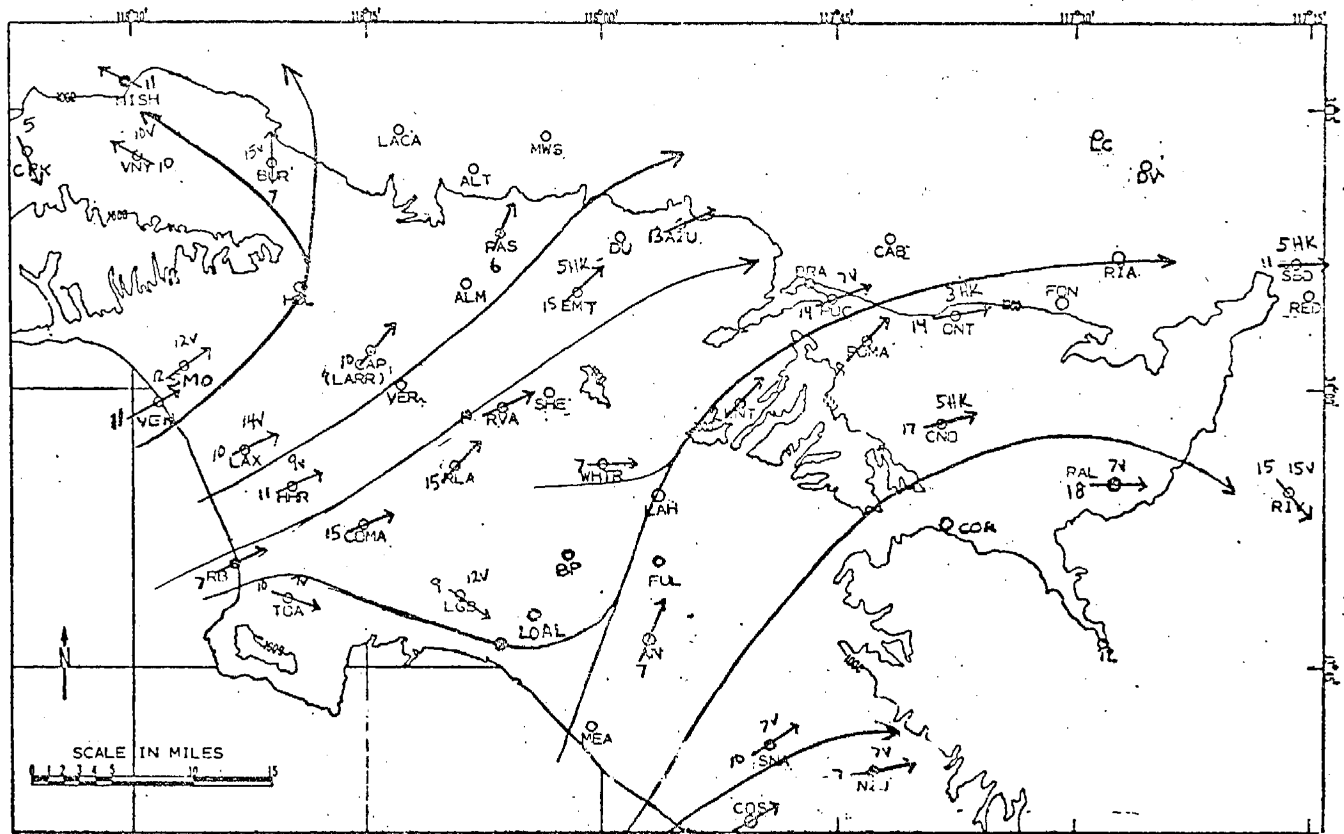
0800 PDT July 11, 1975

LAX	370-3220	moderate
EMT	460-2200	moderate

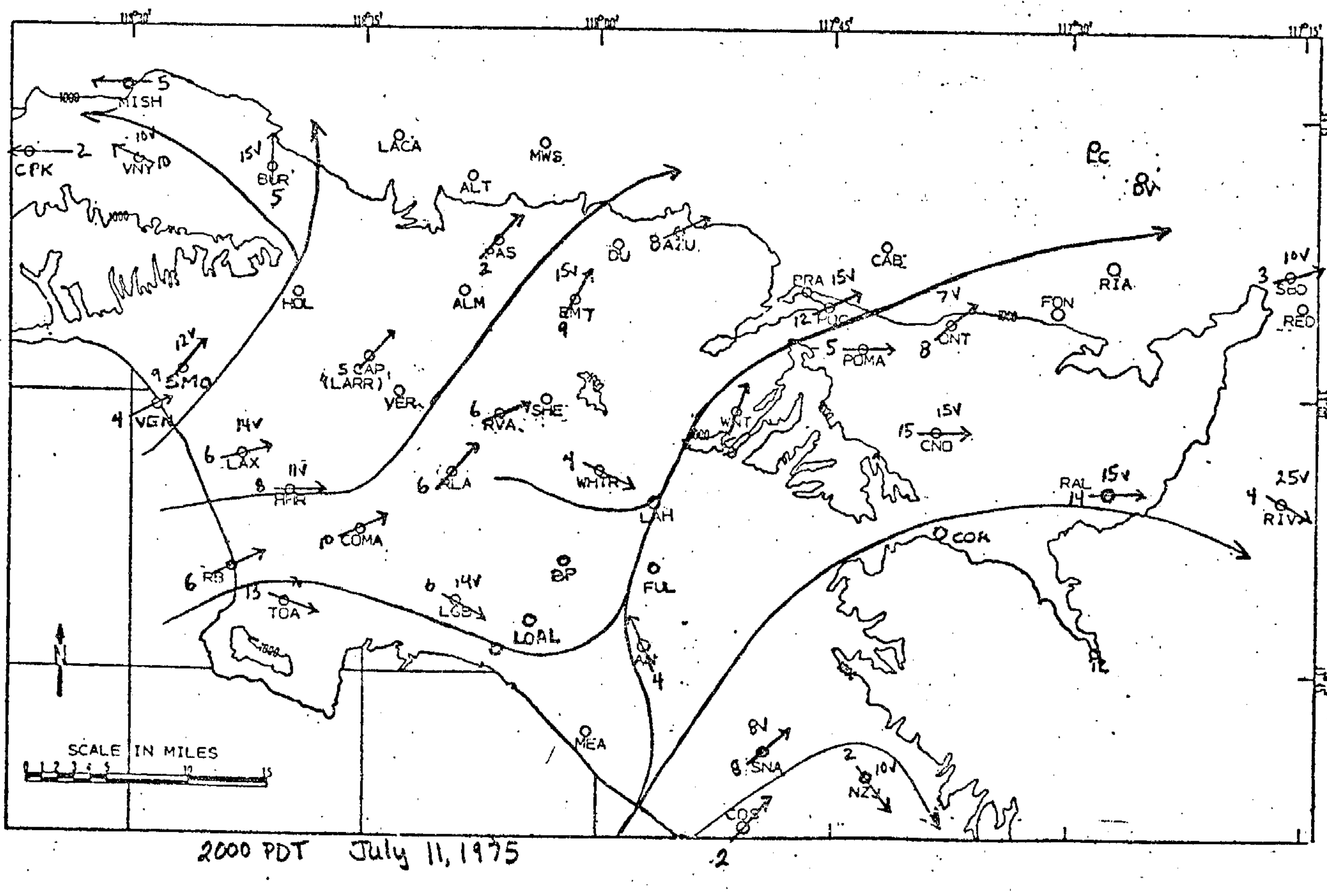


1200 PDT July 11, 1975

LAX	590-2300	moderate
EMT	1180-2000	weak



1600 PDT July 11, 1975



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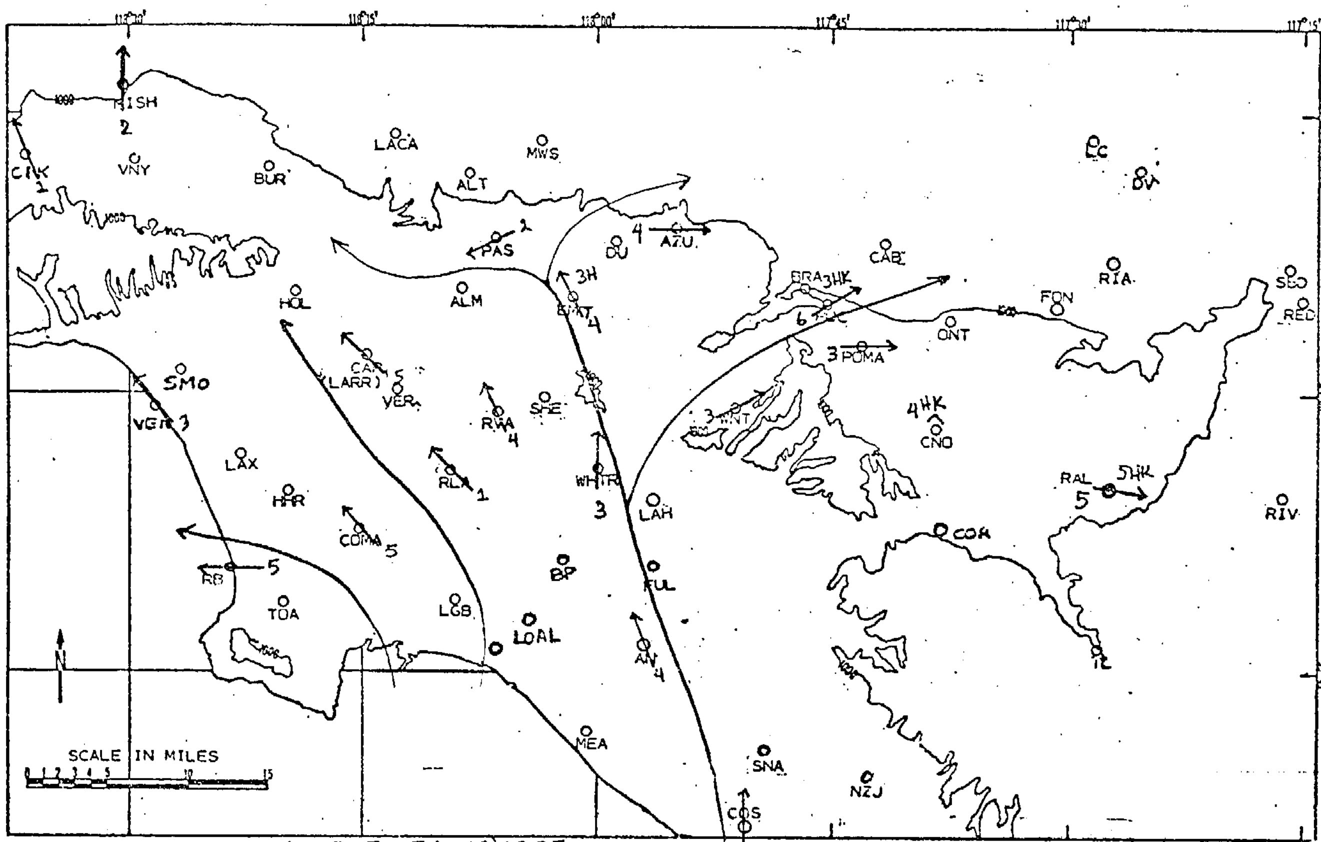
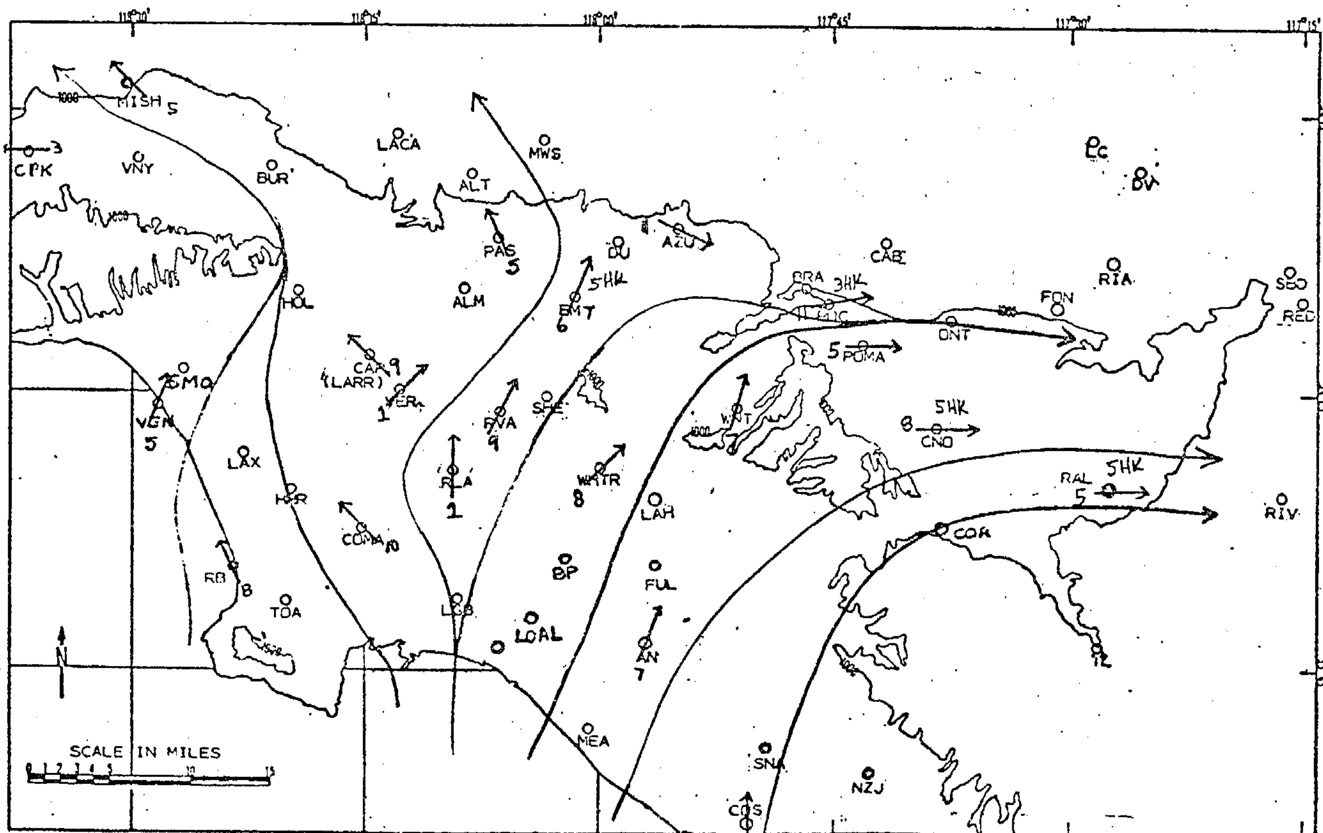


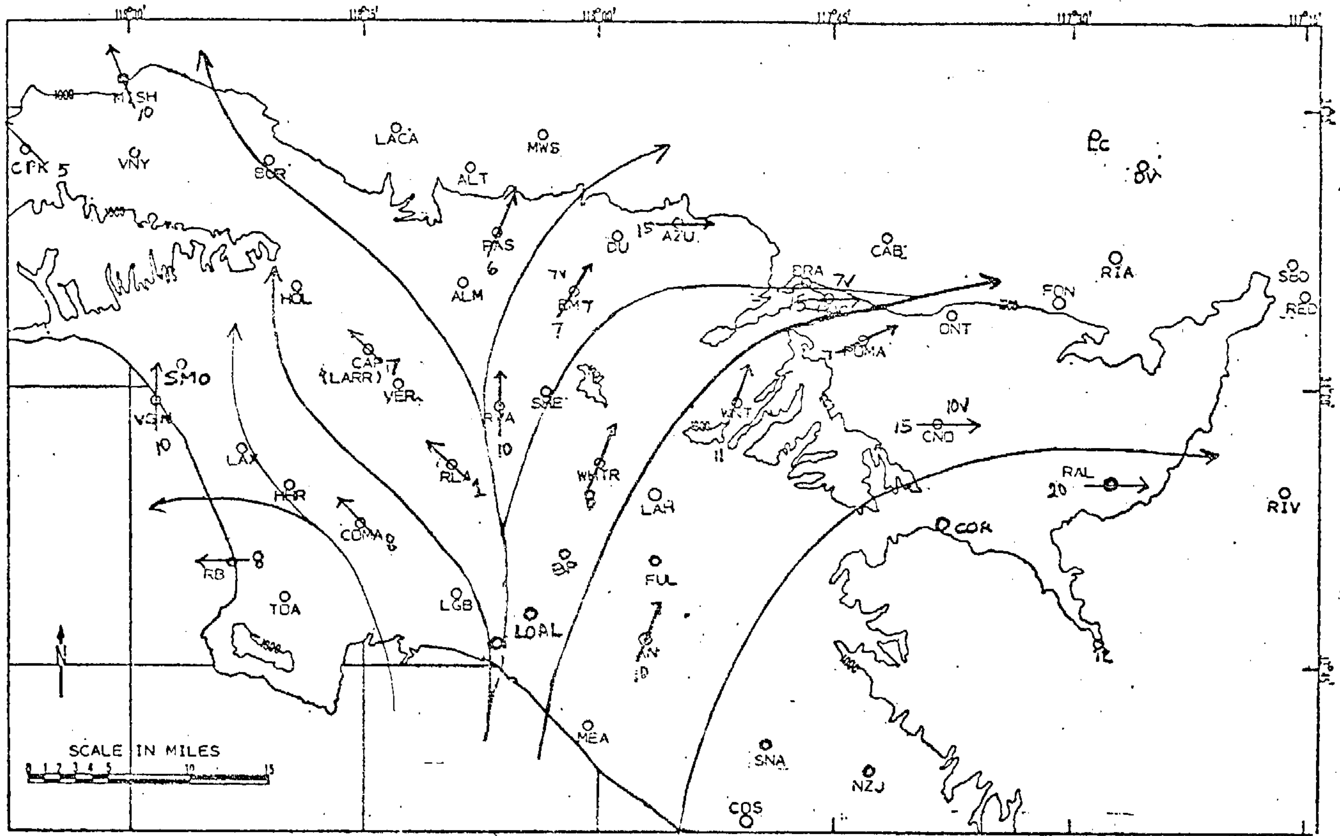
0800 PDT July 12, 1975

LAX	1770-3740	strong
EMT	1280-2790	strong



1200 PDT July 12, 1974

LAX	1740-4040	strong
EMT	N.A.	



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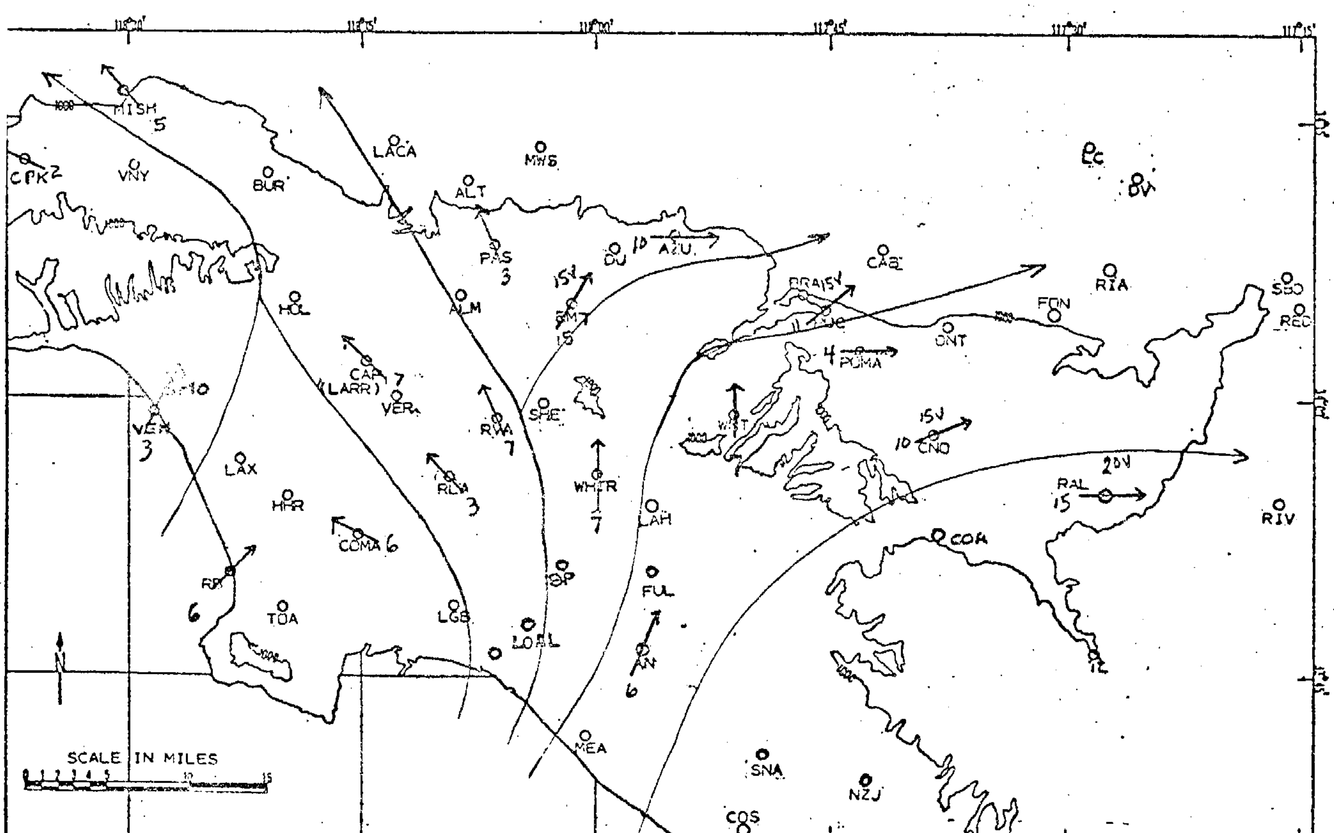

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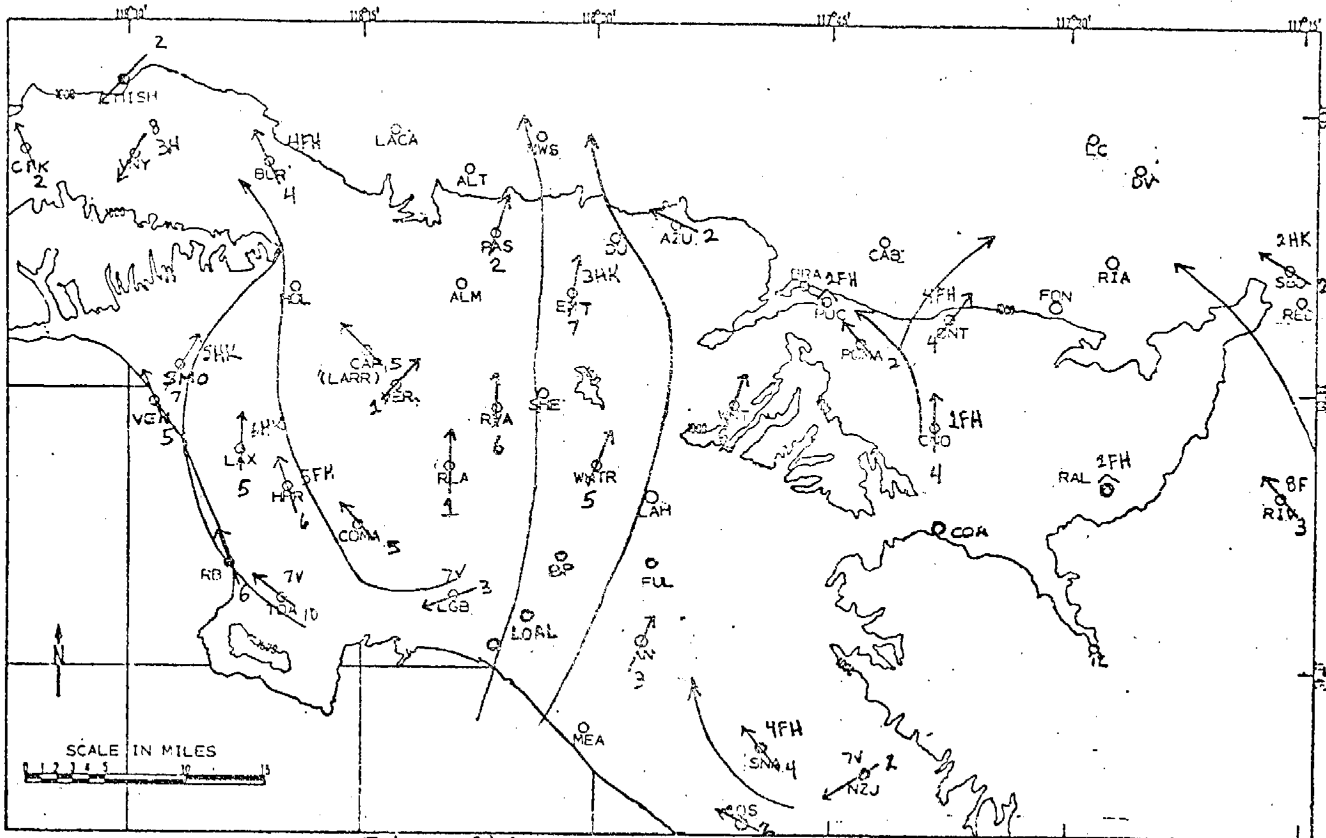
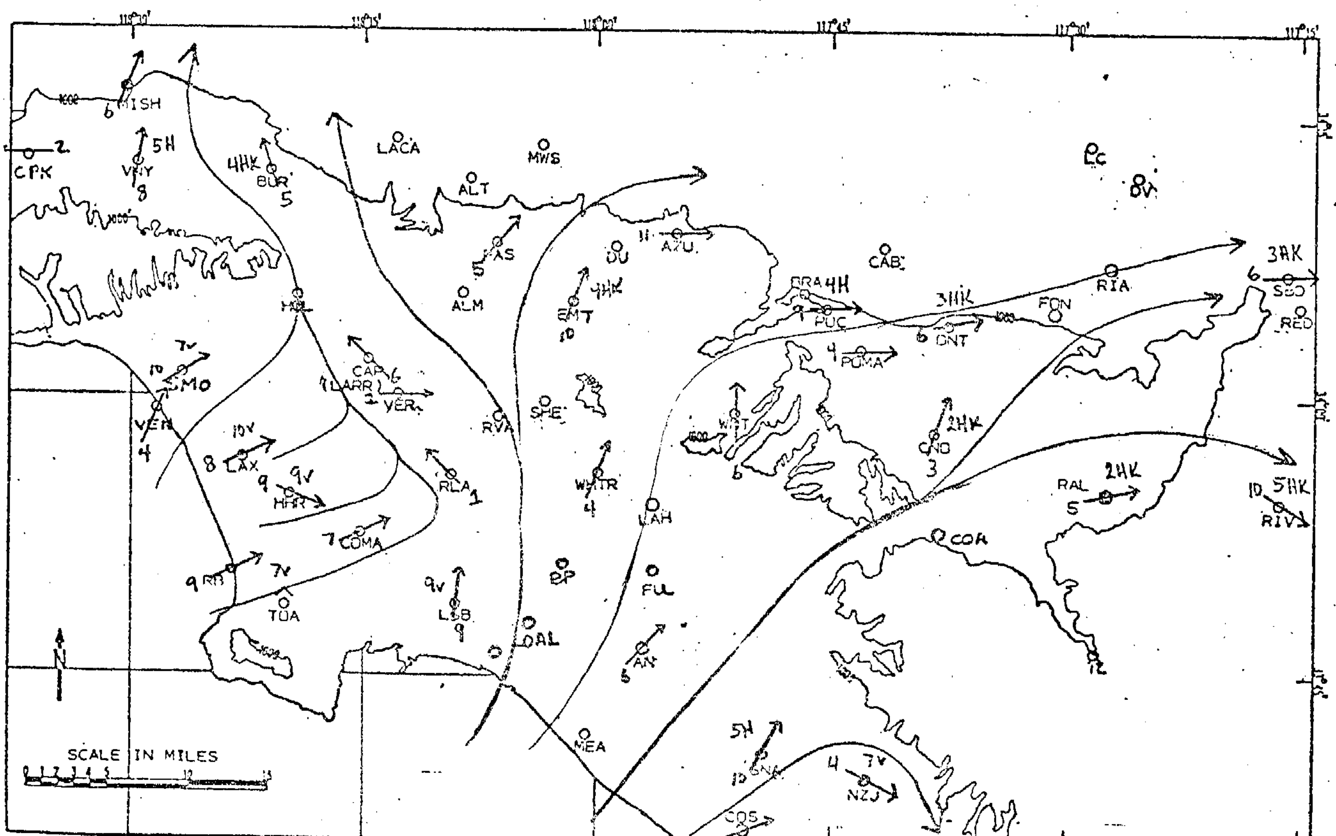


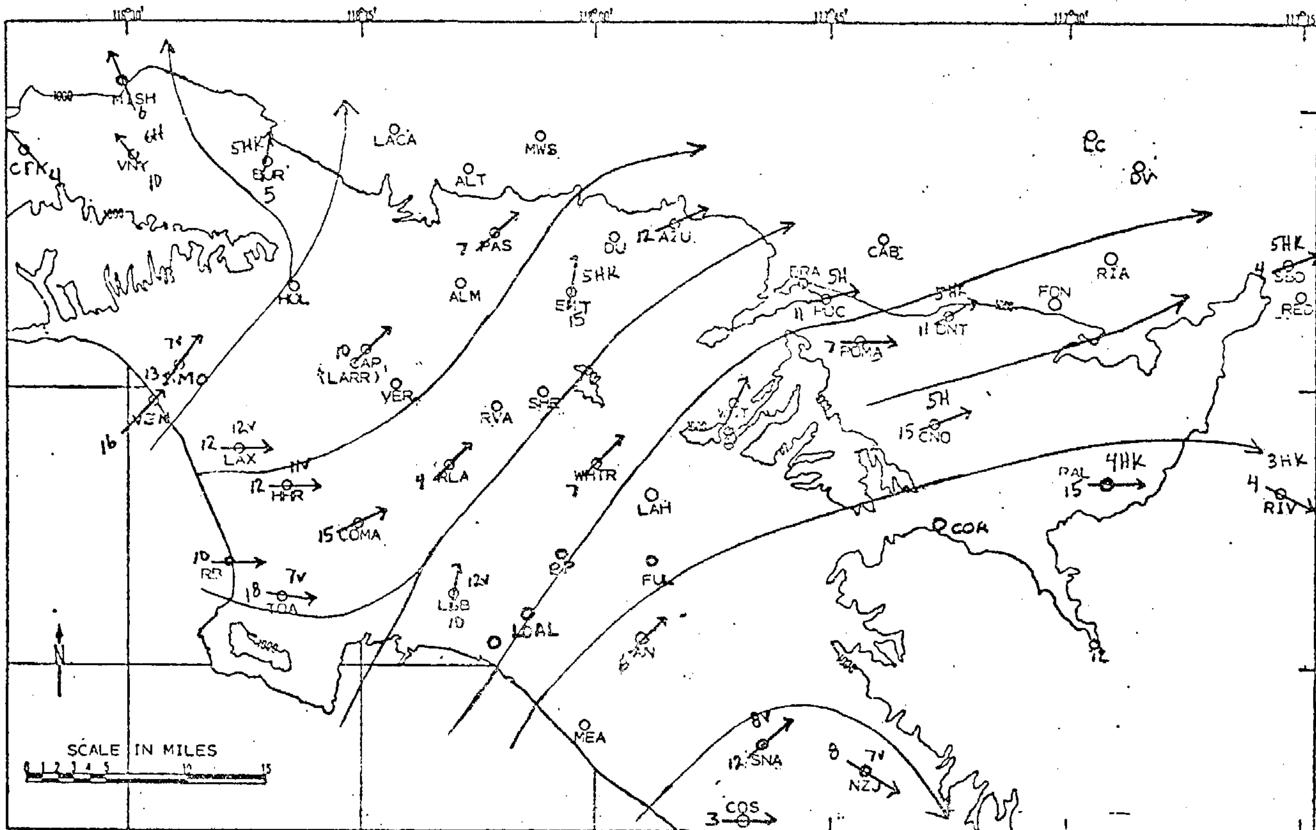
0800 PDT July 14, 1975

LAX	2290-3870	strong
EMT	2660-3510	strong



1200 PDT July 14, 1975

LAX	2360-3410	strong
EMT	2760-3710	moderate



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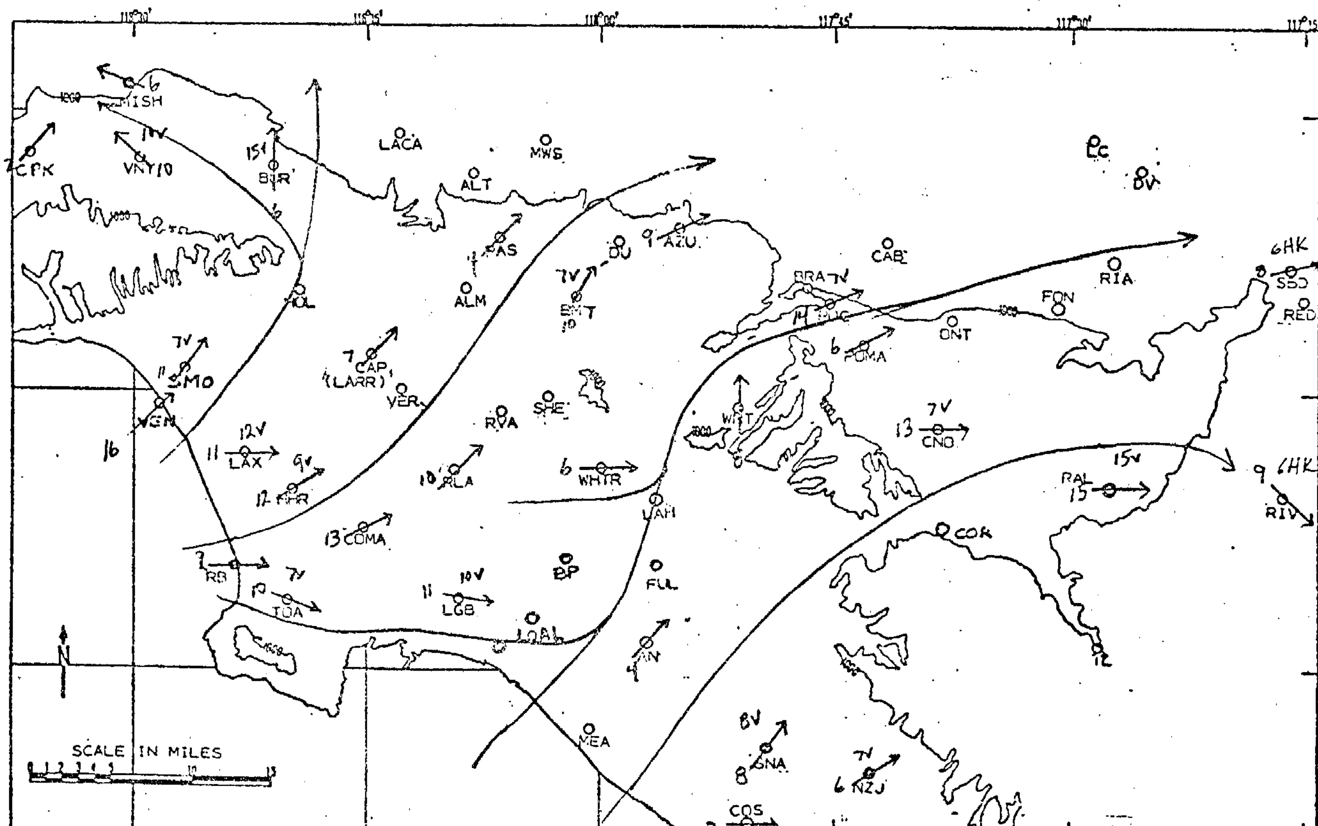

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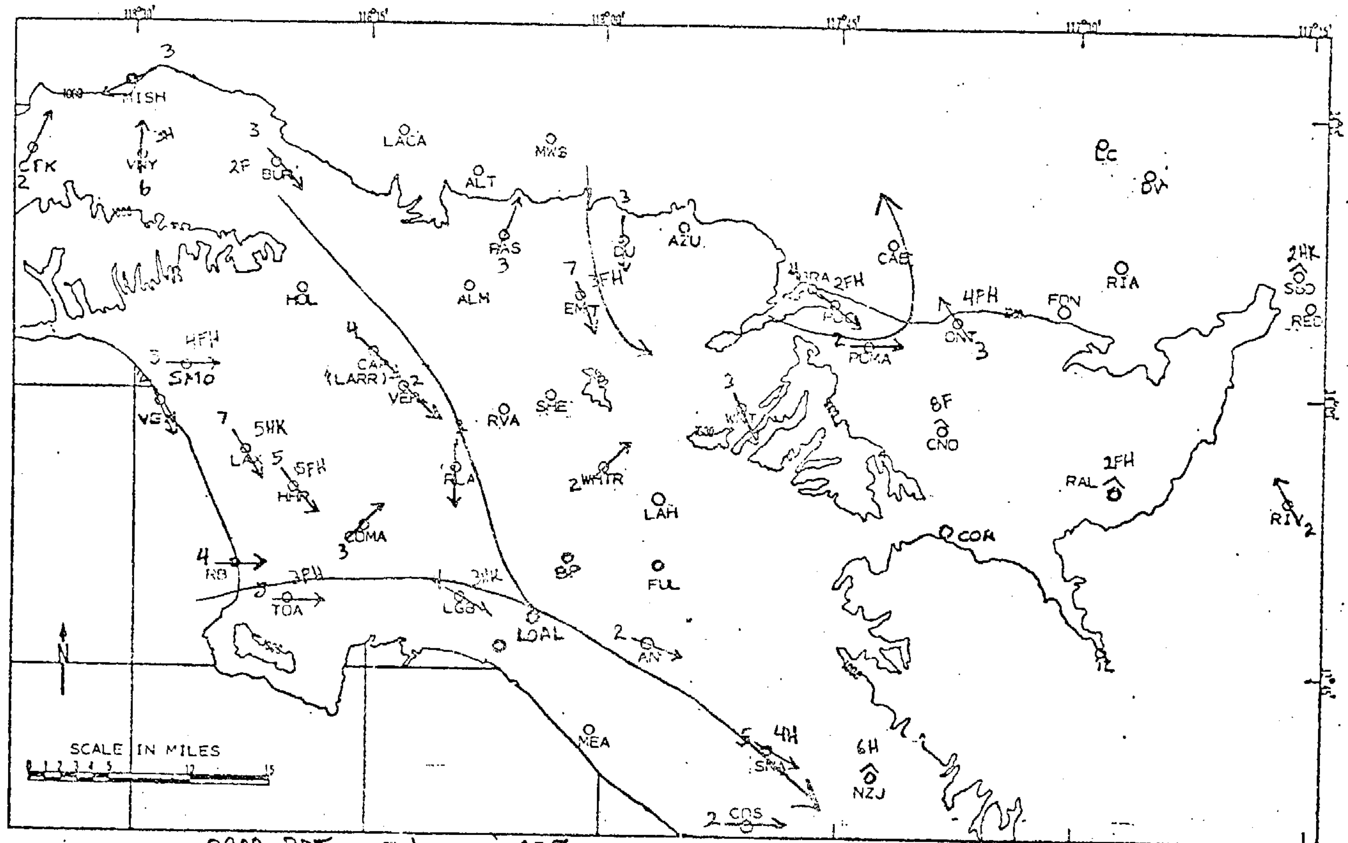
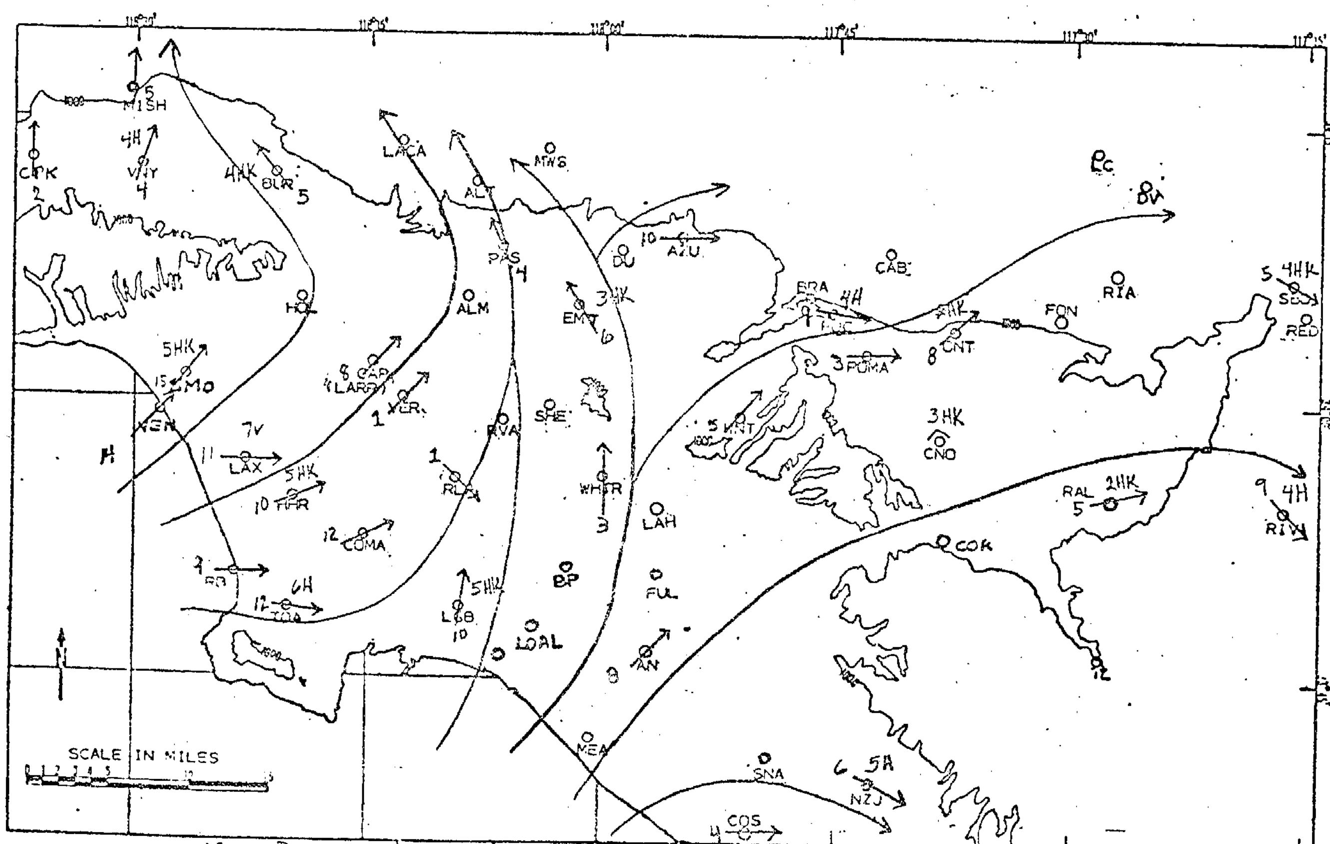


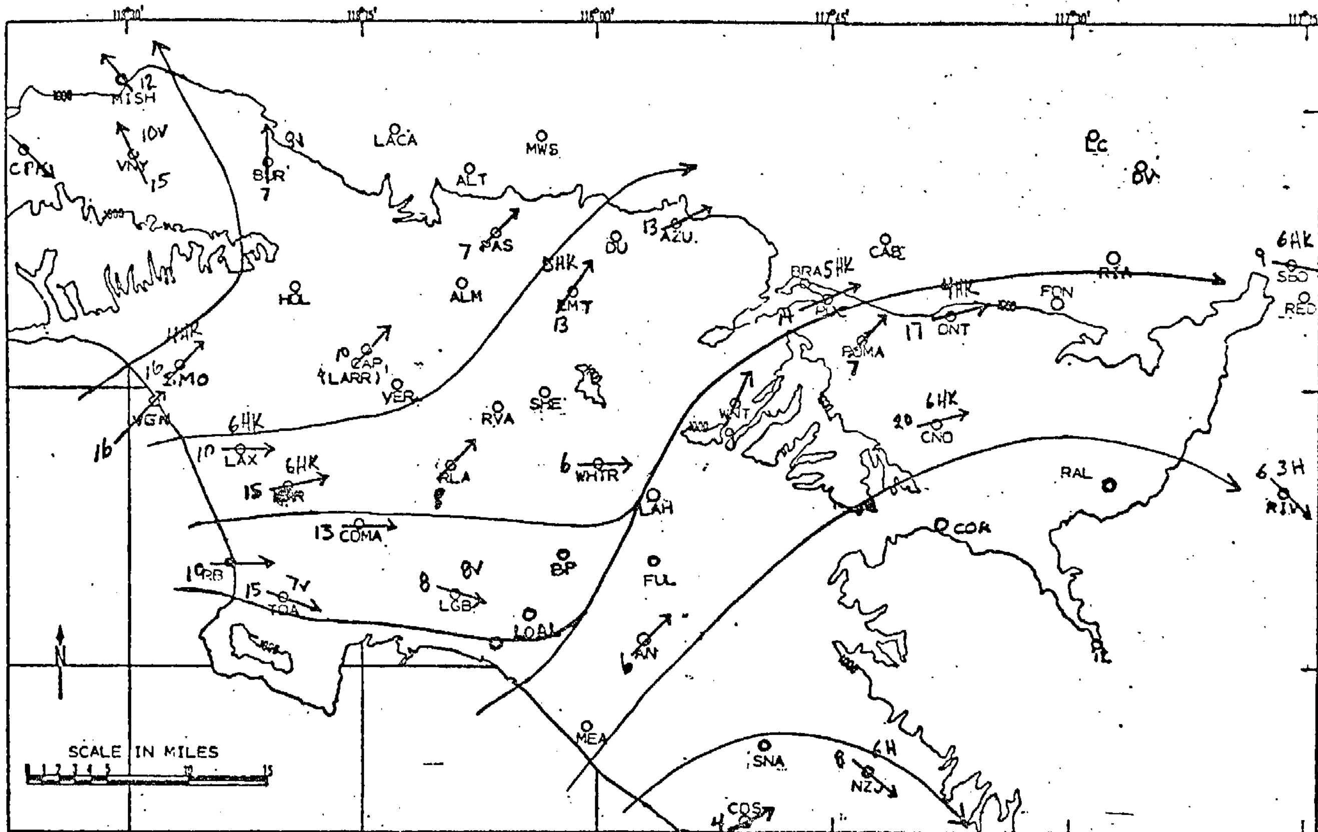
0800 PDT July 15, 1975

LAX	2390-4040	very strong
EMT	multi-layered	weak



1200 PDT July 15, 1975

LAX	1570-2330	moderate
EMT	2430-3610	weak



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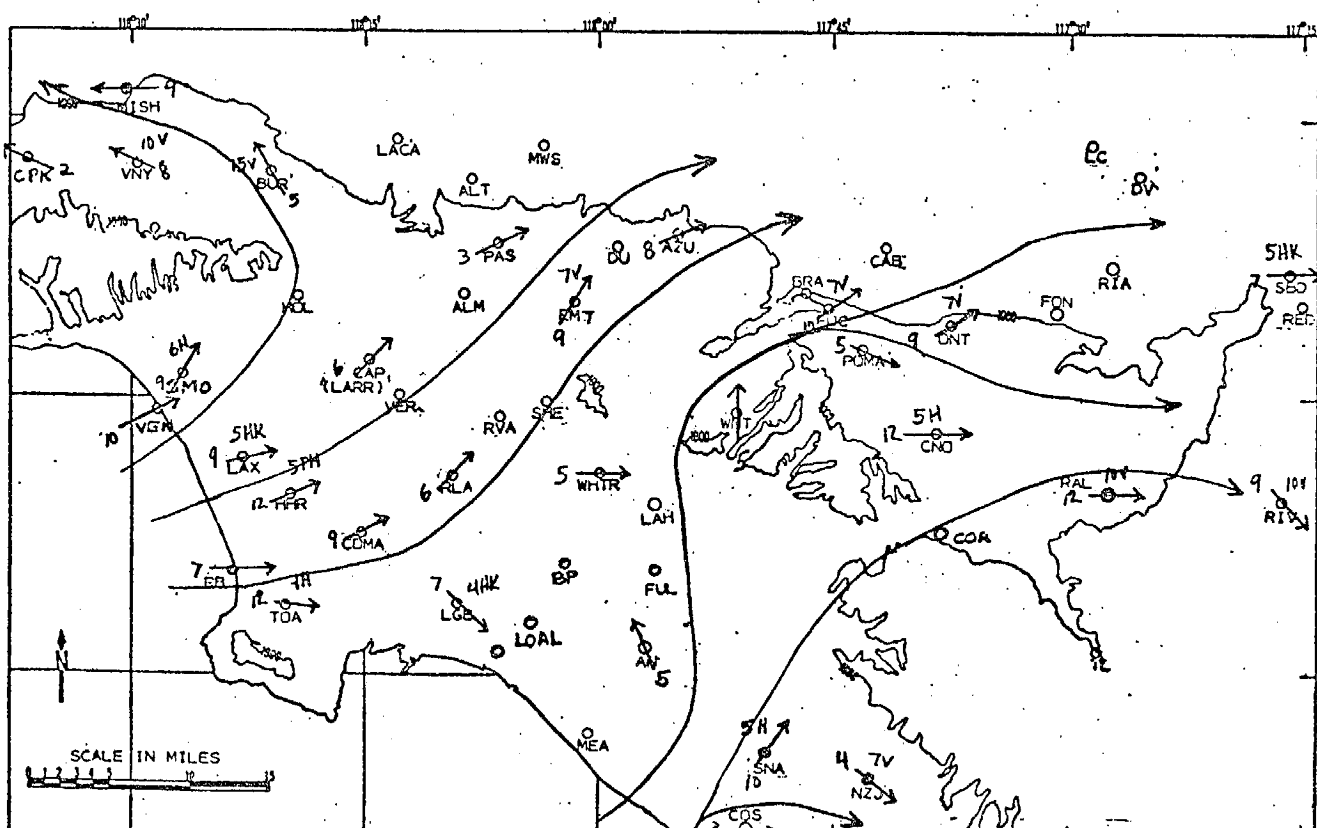

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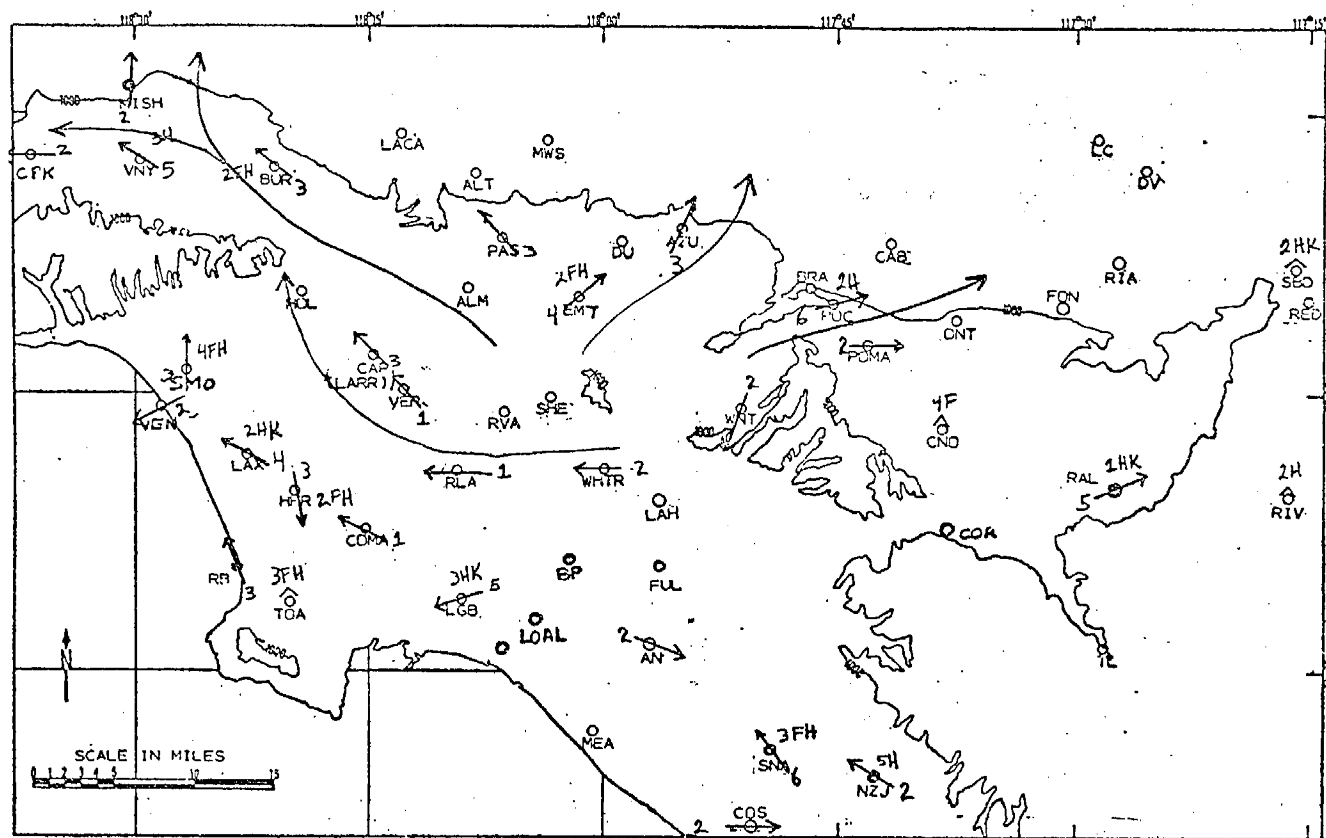
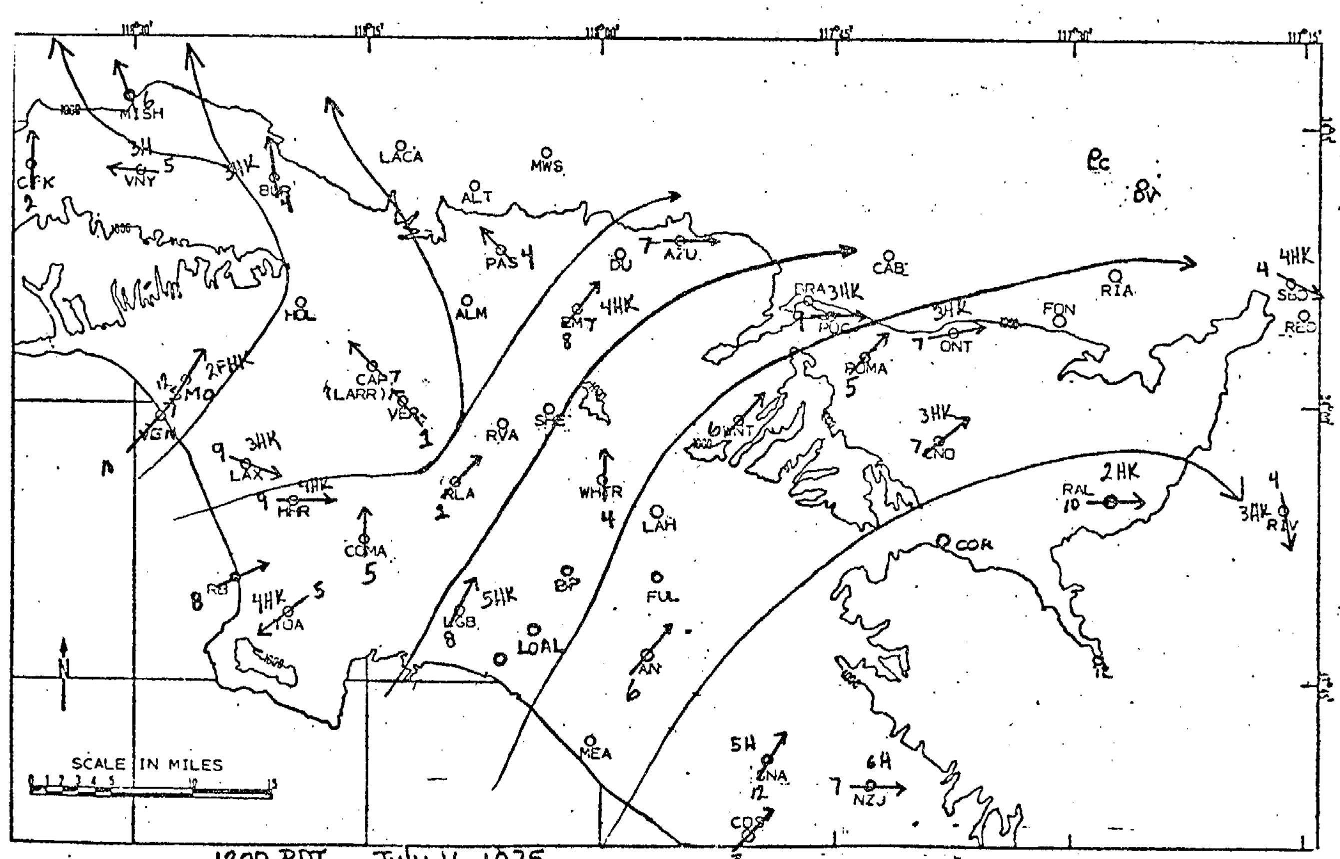


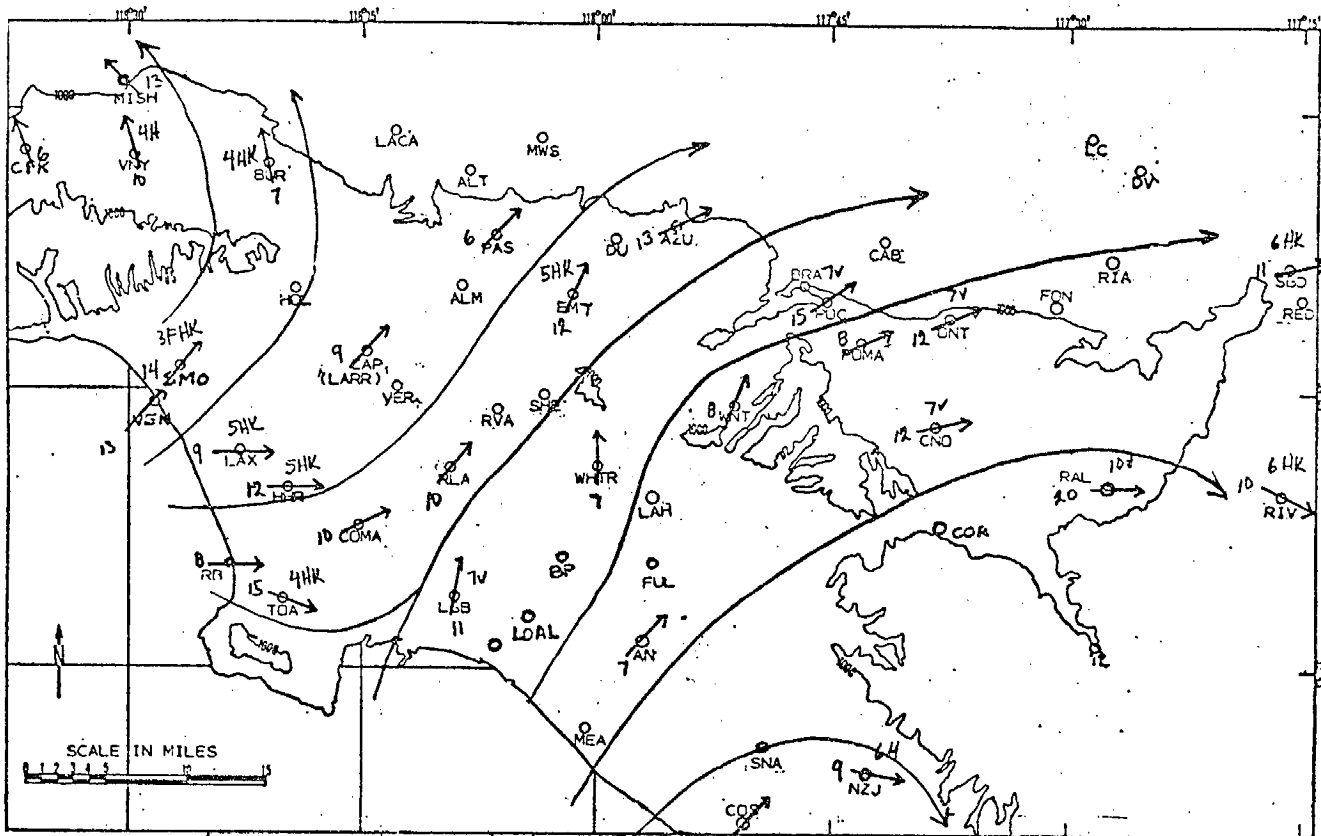
0800 PDT July 16, 1975

LAX	1640-1900	weak
EMT	1900-3100	moderate



1200 PDT July 16, 1975

LAX	1020-2720	moderate
EMT	2100-2850	weak



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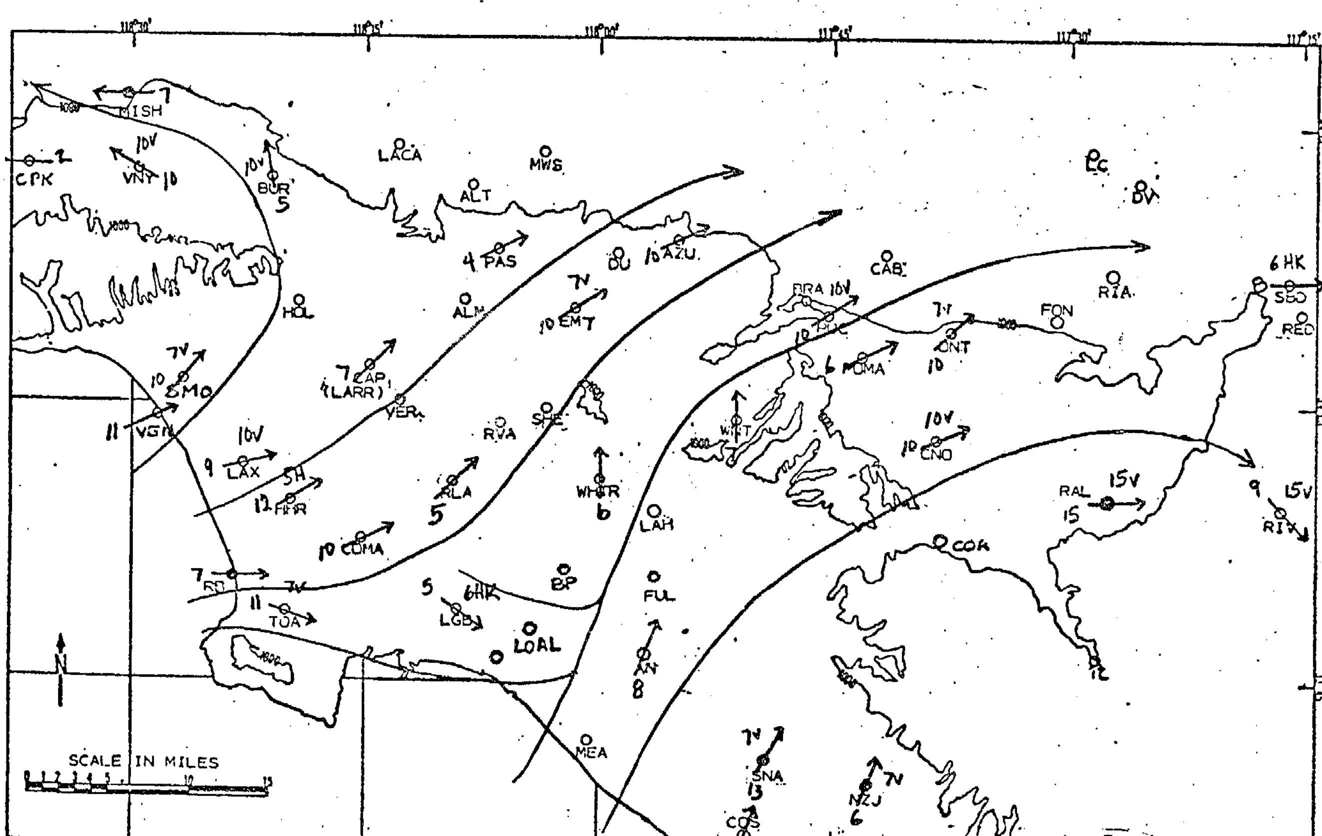

2000 PDT July 16, 1975

Appendix C

Description and Protocol of Procedure for Solvent Extraction, Evaporation and Carbon Analysis

Extractions were done for six hours in carefully precleaned Soxhlet extractors. Cycle time for all Soxhlets units was adjusted to be approximately 15 minutes. With the Soxhlets used for benzene followed by chloroform-methanol extractions, the filters were contained in prefired porous ceramic thimbles. Without the filtration provided by such thimbles, glass fibers from the filters plugged the pipets used for transferring the extract. No such thimbles were needed or used with the cyclohexane extractions.

The Soxhlet extraction was interrupted at a point in the cycle when ca. 5 ml of solvent remained in the extraction flask. This was transferred with washings to a 10 ml volumetric flask. After adjusting the volume to the mark, the contents were permitted to set undisturbed overnight to allow suspended material to settle. One ml aliquots were then removed from the clear solution and transferred, within a laminar flow clean bench, to combustion boats. The ceramic combustion boats were, themselves, resting in prefired nickel crucibles to minimize carbon contamination. Solvent was evaporated by drawing the air of the clean bench slowly over a set of four combustion boats in turn contained in specially-designed containers (Appendix C, Figure C-1). After two hours, the boats, in their nickel crucibles, were transferred to an empty vacuum dessicator and evacuated to ca. 1 mm Hg at room temperature for 30 minutes to remove final traces of solvent (Appendix D discusses the influence of evaporation and pumping time). The boats, in their crucibles, were then transferred to grease-free dessicators containing soda-lime and stored until analysis. Finally, the boats were transferred to the combustion tube of a carbon analyzer*, the carbon combusted to CO_2, trapped and analyzed by gas chromatography with a thermal conductivity detector. A digital integrator was used for peak area determinations.

Each step in the handling and analysis of the samples was scrutinized and subjected to control experiments as part of the evolution of these procedures. These control experiments will be discussed in the quality assurance section.

The following includes protocols for the operations described above.

*P. K. Mueller, R. W. Mosley and L. B. Pierce, J. Colloid Interface Sci. 39 235 (1972) and AIHL Method Number 30.

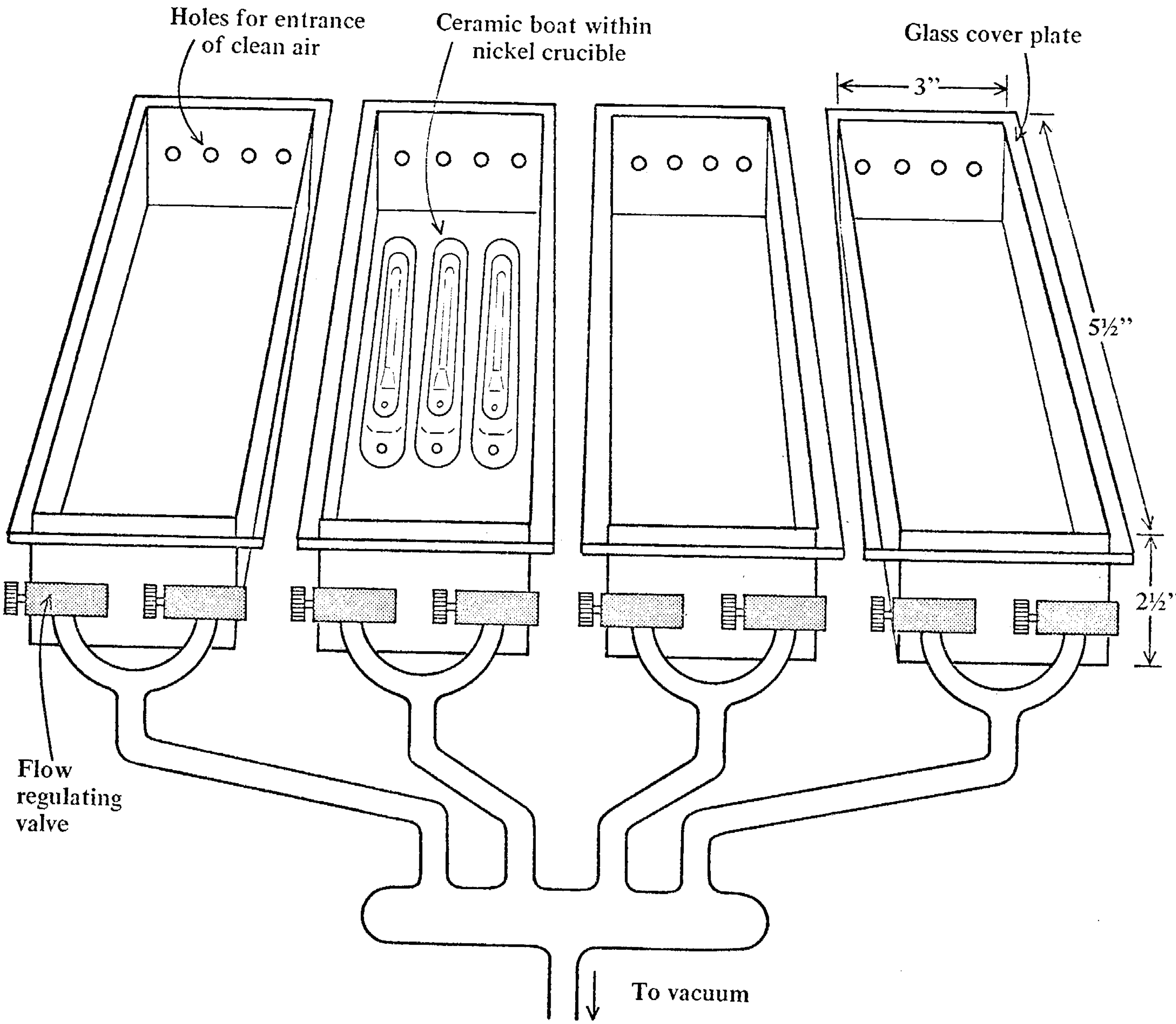

Figure C-1 Apparatus for solvent evaporation in clean air at room temperature (shown with boats in one unit).

SOURCE: STATE OF CALIFORNIA
DEPARTMENT OF HEALTH
AIR AND INDUSTRIAL HYGIENE
LABORATORY, BERKELEY

PROTOCOL FOR DETERMINING CYCLOHEXANE, BENZENE AND METHANOL - CHLOROFORM SOLUBLE CARBON WITH GELMAN AE 8" x 10" FILTERS

1. Cut filter diagonally in two parts (see Figure 10). Each half has three discs (1" diam) removed for Total Carbon, X-ray and Carbonate Carbon and four discs (1/4" diam) cut for M.S.T.A. determinations. Accordingly, 92% of each filter half remains for extractions.

2. <u>Cyclohexane Extraction</u>

2.1 Carefully wrap filter sample with solvent-washed copper wire before extraction. Pipet 5 ml of solvent into 125 ml flask. Connect flask to Soxhlet. Place sample in overflow unit and then carefully add solvent until it just overflows (ca. 55 ml). Wrap all joints tightly and cap unit with aluminum foil.

2.2 Extract for six hours in a hood. Control temperature with Variac. Adjust cycle time to 15 minutes with each unit.

2.3 After extraction, disconnect just before solvent is to siphon back. This will leave $\approx$ 5 ml of organic extract in the bottom of the flask.

2.4 Carefully transfer the $\approx$ 5 ml of organic extract to a clean 10 ml volumetric flask. Then rinse flask with a 1-2 ml portion of solvent and transfer to 10 ml volumetric flask. Repeat washings and transfer. When cool, bring to 10 ml mark with the solvent.

2.5 Transfer a one ml aliquot with MISCO pipet to the ceramic combustion boat (numbered and recorded).

2.6 Evaporate aliquots in boats to dryness by drawing air over samples for two hours in the evaporation set-up on clean bench (Figure B-1). Observe safety precautions particularly with benzene.

2.7 Take dried extracts and put in an empty vacuum desiccator (at room temperature) for 30 min. (1 <u>mm</u> mercury) to remove residual solvent.

2.8 Following vacuum treatment, transfer samples to O-ring sealed (grease-free) desiccators ($\leq$ 4 samples per desiccator) over soda-lime to minimize absorption of CO_2.

2.9 Analyze for carbon in the residue.

2.10 For 10% of all samples, repeat Steps 2.5 - 2.9 with a second aliquot of the same extract in a second boat for a duplicate determination.

2.11 Transfer the remainder of the 10 ml solution to a 20 ml bottle with aluminum foil lining in cap. Label and store.

3. Benzene Extraction

3.1 As in 2.1 but the filter is inserted into a porous ceramic thimble previously fired at 700°C to remove carbon. Then proceed as in 2.2 - 2.3.

3.2 Following benzene extraction, transfer extract to 10 ml vol. flask and save the pot flask (without further washing) for use in the MeOH-$CHCl_3$ extraction on the same filter.

3.3 Following benzene extraction, drain all possible benzene from Soxhlet, loosely cap bottom and top of Soxhlet, lay unit, still containing the solvent saturated filter, on an aluminum foil surface within the hood. Allow residual benzene to evaporate overnight.

3.4 Reassemble Soxhlet. For 14-hour filter samples, add 20 ml MeOH-$CHCl_3$ to still-dirty pot flask and MeOH-$CHCl_3$ in usual amount to Soxhlet and extract for six hours. Transfer to 25 ml flask. Evaporate 1 ml aliquots into boats.

For 2-hour filter samples add 8 ml MeOH-$CHCl_3$ to still-dirty pot flask, and MeOH-$CHCl_3$ in usual amount to Soxhlet and extract for six hours. Transfer to 10 ml flask. Proceed as in 2.5 - 2.11.

3.5 For 10% of all samples repeat steps 2.5 - 2.9 with a second aliquot of the same benzene extract.

4. Methanol-Chloroform Extraction

On the dried sample just extracted in (3), perform 2.1 thru 2.11 using 1:2 v/v methanol-chloroform.

Appendix D

Calibration and Quality Assurance Studies

A. Carbon Determination

For analysis of carbon by combustion, the primary standard for instrument calibration was graphite. Graphite samples in the range 10-350 μg were weighed with a precision of ± 1 μg using a Cahn electrobalance and combusted for this calibration. For daily calibration checks, a standard volume of CO_2 was injected.

In the range 0-350 μg, the least squares line relating graphite and CO_2 calibrations was:

$$\text{Carbon (from graphite)} = \text{carbon (from } CO_2\text{)} \times 0.971 - 7.26$$

Validation of the calibration was further evidenced by the analysis of known amounts of potassium acid phthalate in aqueous solutions.

A particulate sample supplied by Euratom, Ispra, Italy, was distributed to numerous laboratories for analysis of species including carbon. The non-carbonate carbon value obtained by AIHL was 100% of the interlab mean for this sample.

For the routine carbon determination, a systematic check for instrument performance was built into the analytical protocol (Table D-1). At the beginning of each day, a check for leaks was done. Following this, a check for instrument stability was performed by analyzing 1 ml of CO_2 two consecutive times; the two readings had to agree within approximately 2%. Every five samples, or every two hours, a CO_2 standard was run to monitor the drift of the analyzer (ca. 2% per day). The data reduction technique included calculations to allow for this drift.

B. Study of Blanks

The observed values for each sample determination were corrected for blank values obtained with at least six pre-extracted filters. These filter blanks, however, incorporate numerous factors. For example, the solvent blank and blanks due to contamination of a combustion boat in handling. In the evolution of the analytical methodology, blank values were measured for such components which would later contribute to the observed filter blank values. Each solvent used was tested for non-volatile carbon residue by concentrating 200 ml aliquots to 10 ml in a Kuderna-Danish evaporator (Kontes K547300) followed by evaporation and analysis of 2 ml aliquots by the procedure given in Appendix C. This was essential to determine if further purification of the solvents was required. In the case of chloroform, redistillation proved necessary and did greatly decrease the solvent blank. Table D-2 summarizes results for solvent and combustion boat blanks with various treatments.

Table D-1

DAILY CALIBRATION AND QUALITY ASSURANCE PROTOCOL FOR CARBON ANALYZER OPERATION[a]

Step 1 - Inject 1.00 ml CO_2 at the loop (freeze trap). Proceed as follows:

Collection:	1 minute
Helium flush:	3 minutes
Warm-up:	2 minutes

Press injector valve and activate recorder and integrator. Record time (in 10-minute increments) and peak area.

Step 2 - Repeat Step 1.

a. If Steps 1 and 2 agree within 6000 counts (or 1% of average peak area), proceed with Step 3.

b. If Steps 1 and 2 differ by more than 6000 counts, check and clean the loop, check the valves, verify the GC performance.

Step 3 - Inject 1.00 ml CO_2 at the combustion furnace. Proceed as follows:

Purge:	5 minutes
Combust:	10 minutes
Helium flush:	3 minutes
Warm-up:	2 minutes

Press injector valve and activate recorder and integrator. Record time and peak area.

a. If result is 97 $\pm$ 2% of average peak area obtained in Steps 1 and 2, proceed with Step 4.

b. If result is less than 95% of average Steps 1 and 2, check for leaks (glass connections, combustion tubes).

Step 4 - Analyze four samples using the same operating schedule as in Step 3. Record time and peak area.

Step 5 - Inject CO_2 at the loop as in Step 1. Proceed by alternating Steps 4 and 5. CO_2 at the loop should be checked at least every 2 hours.

[a]Refer to AIHL Method 30 "Carbonate and Non-Carbonate Carbon in Atmospheric Particulate Matter", for operational details.

Table D-2

SOLVENT (NON-VOLATILE C) AND COMBUSTION BOAT CARBON BLANKS

Description	Number of Determinations	Mean $\pm$ 1 σ (μg C)
Prefired boat (700°C)	8	1.30 $\pm$ 0.4
Prefired boat, clean air flow for 2 hours,[a] after 6 hours at $\leq$ 1 mm Hg	8	1.89 $\pm$ 0.3
Prefired boat, clean air flow for 4 hours,[a] 6 hours at $\leq$ 1 mm Hg	4	2.40 $\pm$ 0.5
Aluminum foil, ca. 1 in^2 [b]	6	3.83 $\pm$ 1.1
Benzene[c]	4	3.09 $\pm$ 0.4 per 40 ml[d]
Cyclohexane[c]	2	3.46 $\pm$ 0.2 per 40 ml[d]
Methanol[c]	4	16.3 $\pm$ 2.4 per 40 ml[d]
Chloroform[c]	4	61.9 $\pm$ 4.7 per 40 ml[d]
Chloroform, as above after redistillation	4	7.50 $\pm$ 1.3 per 40 ml[d]

a. 700-800 ml/min.

b. Used for weighing and containing graphite in calibration

c. Matheson, Coleman and Bell "Spectroquality" solvent

d. 200 ml of solvent was condensed to 10 ml and from this 2 ml were evaporated to dryness and analyzed for carbon following the protocol given in Section IIIC. This is equivalent to the evaporation to dryness of 40 ml solvent.

Filter blanks were determined at three points in the study:

1. Immediately following the filter pretreatment by solvent extraction and high temperature drying, blank filters were checked for total carbon. This insured that further treatment was unnecessary before field use.

2. At the beginning of the development of extraction methodology to provide estimates of the limits of detections of the various solvent extracts based upon the variance of the blanks.

3. About halfway through the extractions of atmospheric samples. This was done using the exact protocols evolved for use with samples. These values were used to correct the atmospheric sample results and are summarized in Table D-3.

C. Loss of Organics by Evaporation

As described in Appendix C, following room temperature evaporation of solvents, the boats were placed in an empty dessicator and subjected to high vacuum (ca. 1 mm Hg) at room temperature to remove the residual solvent from the sample. In this process, there is a risk of losing the more volatile fraction of the residue. An experiment was conducted to establish the extent of such loss as a function of time in vacuum. The results are given in Table D-4. The maximum loss was about 10%. While the results suggest that room temperature evaporation of solvent was sufficient for its complete removal, a protocol involving 30 minutes under high vacuum was considered to provide an additional margin of safety without risk of significant loss of aerosol constituents.

D. Carbonate Carbon

Calcium carbonate was used to calibrate the analyzer against direct injections of CO_2. The recovery of carbonate C average 88%. The validity of this calibration was demonstrated by analyzing 1" filter discs spiked with known quantities of Na_2CO_3. Recovery of Na_2CO_3 from filter discs was found to be 86 $\pm$ 19%.

E. Precision Studies

The observed precision reflects a number of factors including the reproducibility of the extractions, evaporation, carbon determination and the homogeneity of deposition of carbon across the filter. In some cases, these parameters were evaluated independently, but in general, the resulting variance reflected their combined contributions.

The experimental design and results are as follows:

1. Precision of the total carbon (CEL) determination

Two 1" discs were punched out of every filter in the four episodes to be studied and analyzed for CEL. The discs came from opposite halves

Table D-3

FILTER BLANKS FOR PRETREATED GELMAN AE GLASS FIBER FILTERS

Species	$\mu g\ C/cm^2$ [a]
Total carbon (CEL)	2.41 ± 0.18 [b]
Cyclohexane extractable C (CEC)	0.24 ± 0.081
Benzene extractable C (BEC)	0.094 ± 0.012
Methanol-chloroform extractable C (MCC)	0.52 ± 0.10

a. Mean of six samples $\pm 1\ \sigma$

b. Compares to 3.3 ± 0.2 for Gelman AE filters as purchased.

Table D-4

LOSS OF EXTRACTED ORGANIC AEROSOL CARBON AS A FUNCTION OF TIME IN VACUUM (ca. 1 mm Hg) AT ROOM TEMPERATURE

Sample[a,b]	Sampling Site	Time (minutes) 0	2	60	180	360
		μg carbon				
CEC	Pasadena	116.4	115.4	114.0	106.3	106.6
BEC	Riverside	102.4	104.0	105.7	101.8	97.6
MCC	Riverside	156.0	162.6	161.5	160.2	150.5

a. See Table 5 for explanation of terms

b. This experiment used 14-hour filter samples collected July 16, 1975 on a day of moderate smog (ozone 0.2 ppm).

of each filter (see Figure 9). The results of ten randomly selected sets of duplicates were statistically evaluated and used as a measure of precision for CEL (see Table D-5). The resulting coefficients of variation ranged from 2 to 3% with somewhat better results for 14-hour compared to 2-hour samples.

2. Precision of the solvent extractable carbon determinations

2-hour and 14-hour filter samples were cut into two or more equal area sections. Two equivalent sections from a number of filters were extracted in cyclohexane or benzene followed by methanol-chloroform. The results expressed as pooled coefficients of variation are also given in Table D-5. As expected, the 14-hour samples lead to generally better precision than the 2-hour samples. The poorest results were for cyclohexane extractable carbon on 2-hour samples which exhibited a C.V. of nearly 16%. This is consistent with the low level of cyclohexane extractable carbon observed which ran as low as about 10 μg per aliquot analyzed.

3. Precision of evaporation and carbon determination

Randomly selected extracts representing about 12% of all the extracts in each solvent system were reanalyzed by evaporating a second aliquot from the same extract. The second analysis was done on a separate day, included in a new batch of samples. This "blind" reanalysis minimized any bias associated with special handling. The precision results, expressed as pooled coefficients of variation, are given in Table D-6. The low level of CEC in a 1 ml aliquot (i.e., 10%) of the extract suggested that it might be better to evaporate two 1 ml aliquots into the same crucible. The additional possibility for contamination and longer (e.g., 4-hour vs. 2-hour) time need for evaporations suggested this be done only if essential.

To test this, a set of 14 samples containing from 12 to 32 μg CEC per 1 ml aliquot were reanalyzed using 2 ml (i.e., 20%) of the extract. The results, in μg CEC per 1 ml, agreed on average within 2% of the value obtained with 1 ml. Accordingly, no change in protocol was made.

4. Uniformity of carbon deposition

While an upper limit to non-uniformity is included in the value quoted for the precision of CEC in Table D-5, an independent and more detailed study of this was done. A single 8 x 10" 24-hour glass fiber sample collected in Berkeley was used to supply ten 1" discs chosen to represent the complete filter. Analysis of these discs for CEL exhibited a C.V. of 2.3%, suggesting good uniformity of deposition. Furthermore, this result is in good agreement with the C.V. value 1.9% found for CEL in 14-hour samples (2 discs per sample) as given in Table D-5.

Table D-5

PRECISION OF CARBON DETERMINATIONS

Determination[a]	Sampling Time Hours	Number of Duplicates[b]	Pooled Coefficient of Variation of Duplicates
CEL	2	10	2.6
CEL	14	10	1.9
CEC	2	3	15.5
CEC	14	3	4.7
BEC	2	7	11.8
BEC	14	5	4.2
MCC	2	5	3.3
MCC	14	6	10.3

a. See Table 5 for explanation of terms.

b. Refers to duplicate sections cut from the same filters.

Table D-6 Precision of Evaporation and Carbon Determination of Solvent Extracts

Determination[a]	Sampling Time, Hours	Number of Duplicates[b]	C.V. (%)
CEC	2	9	8.6
CEC	14	3	0.2
BEC	2	9	10.6
BEC	14	3	6.0
MCC	2	9	11.9
MCC	14	3	3.6

[a]See Table 5 for explanation of terms.

[b]Refers to duplicate evaporations of 1 ml aliquots from the same extracts.

F. Loss of Bromine During X-Ray Fluorescence Analysis

One-inch disc filter samples, stored in a freezer until ready for analysis, were analyzed for Pb and Br by a Philips Model PW1410 wavelength dispersive x-ray spectrometer at atmospheric pressure, 58 kv and 40 ma current. Since some bromine loss was expected, multiple analyses were done on a well-loaded sample.

Table D-7 details the results for both Pb and Br. Over a period of 1 hour, a bromine loss of 25% was observed while Pb remained constant. These results suggest a loss of, at most, several percent in bromine during the initial analysis (plotting Br vs. mid-point times and extrapolating to zero indicates about a 3% loss).

G. The Precision of the MSTA Technique

Precision for MSTA analyses was established by replicate determinations (on separate days) of three of the 2-hour samples collected in Riverside during the July 9 episode. The results are shown for each identifying fragment (Table 6 lists identifying fragments and probable structures, where known, for constituents discussed in this report) separately for compounds present above and below 0.1 $\mu g/m^3$. (Table D-8 and D-9) The combined coefficient of variation for all materials is close to 50% in both cases with precision for higher concentration somewhat better.

H. Comparison of Organics Recovered by Solvent Extraction-Carbon Analysis and MSTA

In an effort to compare the total organics observed by MSTA with those obtained by the solvent extraction-carbon determination, the total $\mu g/m^3$ for all compounds and/or fragments measured by MSTA was calculated for the 14-hour samples. Since this total includes the elements H, O, N, S and possibly others, in addition to carbon, these totals are only proportional to the carbon present. For the 13 most abundant compounds determined by MSTA (see Table E-2) the average carbon content was 60%. Using this value as approximately applicable to the total organics by MSTA permits an approximate comparison with solvent extraction-carbon analysis.

Table D-10 compares the total extractable carbon, as measured by the sum of benzene and methanol-chloroform extractable carbon, with the total organics by MSTA. The ratio of MSTA total organics to total extractable carbon is relatively constant at about 0.5. Assuming the organics observed by MSTA to be 60% carbon, MSTA is seen to account for about 30% of the soluble carbon.

The comparison given in Table D-10 is limited because of the possibility of thermal decomposition of the polar organics (leading to non-volatile carbonaceous material) present in the samples during the MSTA. In an effort to minimize this factor, Table D-11 compares the organics observed by MSTA and solvent extraction carbon analysis employing analyses done on cyclohexane extracts. Since in this solvent the abundance of polar organics is reduced, we presume that effects of thermal decomposition would be minimized. This solvent may also minimize the extraction of high molecular weight organics which would not volatize at $\leq$ 380°C in vacuum. As shown in the table, MSTA

Table D-7

LOSS OF BROMINE WITH TIME UNDER X-RAY ANALYSIS CONDITIONS FROM PARTICULATE SAMPLE ON GLASS FIBER FILTER DISC

Time Minutes	Br ($\mu g/cm^2$)		Pb ($\mu g/cm^2$)
0- 9	0.72		5.6
9-18	0.68		5.9
18-27	0.65		5.9
27-36	0.63		5.9
36-45	0.63		5.9
45-54	0.60		5.6
54-63	0.54		6.0
		Mean	$5.8 \pm .2$

Table D-8

PRECISION OF MSTA FOR IDENTIFYING FRAGMENTS BELOW 0.1 $\mu g/m^3$

($\mu g/m^3$)

Filter No.:[a]	RB474HR		RB475HR		RB478HR		C.V. (%)
Trial:	1	2	1	2	1	2	
C_5H_{11}							
C_5H_9							
C_7H_7							
C_8H_{10}	.03	.02					28.3
C_9H_{11}			.06	.06	.031	.057	23.6
C_9H_{12}	.028	.077	.054	.030			58.0
C_9H_{10}			.032	.020			32.6
$C_{10}H_8$					.032	.015	51.2
C_8H_8	.042	.021	.0081	.0018	.053	.096	53.3
$C_{11}H_{10}$	.042	.0096					88.8
$C_{11}H_{13}$					.015	.003	94.3
C_6H_5O							
C_6H_6O	.09	.063	.006	.026	.11	.026	69.0
$C_6H_6O_2$	.074	.066	.043	.031	.081	.063	16.7
C_7H_6O			.022	.005			89.0
C_7H_8O	.038	.030	.041	.026	.018	.042	36.9
$C_9H_{12}O$	.053	.11					49.5
$C_2H_4O_2$							
$C_4H_6O_2$							
$C_5H_8O_2$							
$C_6H_{10}O_2$							
$C_6H_{10}O_4$							
$C_9H_{10}O_2$					.022	.01	53.0
C_2H_2N							
CHNO							
$C_4H_9N_2$							
$C_5H_8O_3$	.104	.068					29.6
$C_6H_8O_2$							
$C_7H_{10}O_2$							
$C_8H_5O_3$							
$C_5H_{10}O_3$							
$C_5H_9NO_4$					.12	.059	48.2
$C_5H_9NO_5$					.06	.021	68.1
Sulfates							
NH_4Cl							
NH_4NO_3							
						Combined:	51.3[b]

a. Samples used were collected in Riverside, Episode B (July 9, 1975).

b. Excludes inorganic compounds.

Table D-9

PRECISION OF MSTA FOR IDENTIFYING FRAGMENTS ABOVE 0.1 $\mu g/m^3$ ($\mu g/m^3$)

Filter No.:[a]	RB474HR		RB475HR		RB478HR		C.V.(%)
Trial:	1	2	1	2	1	2	
C_5H_{11}	.25	.25			.32	.15	35.1
C_5H_9	.69	.53			.90	.51	32.1
C_7H_7	.31	.20	.43	.21	.28	.09	50.1
C_8H_{10}	--	--					
C_9H_{11}	.18	.093	--	--	--	--	45.1
C_9H_{12}	--	--	--	--			
C_9H_{10}			--	--			
$C_{10}H_8$	.25	.11			--	--	55.0
C_8H_8	--	--	--	--	--	--	
$C_{11}H_{10}$	--	--			--	--	
$C_{11}H_{13}$							
C_6H_5O	.35	.24	.56	.19	.37	.021	73.6
C_6H_6O	--	--	--	--	--	--	
$C_8H_8O_2$	--	--	--	--	--	--	
C_7H_5O			--	--			
C_7H_8O	--	--	--	--	--	--	
$C_9H_{12}O$	--	--					
$C_2H_4O_2$	.63	.68	.83	.56	.72	.83	17.1
$C_4H_8O_2$	2.1	1.9			2.6	1.7	22.2
$C_5H_8O_2$	1.8	1.9	1.8	3.8	3.1	1.4	46.6
$C_8H_{10}O_2$	.37	.89			1.3	.99	34.1
$C_6H_{10}O_4$					4.1	1.4	69.4
$C_9H_{10}O_2$					--	--	
C_2H_2N	.5	.19	3.9	3.9	.38	.29	8.6
CHNO	3.5	2.5	4.6	3.8	4.8	3.5	19.7
$C_4H_9N_2$			0.70	.056			120
$C_5H_8O_3$	--	--					
$C_6H_8O_2$	.74	1.0	.77	.94	.67	.76	16.2
$C_7H_{10}O_2$	.29	.30			.55	.29	36.4
$C_8H_5O_3$	1.0	1.9	2.5	1.3	1.4	1.6	38.2
$C_5H_{10}O_3$			.26	.077			76.8
$-C_5H_9NO_4$					--	--	
$-C_5H_9NO_5$					--	--	
Sulfates	5.9	4.2	5.1	4.7	4.2	2.8	20.4
NH_4Cl	3.6	3.2	2.1	3.2	.54	.26	22.9
NH_4NO_3					2.1	1.5	23.6
						Combined:	45.6[b]

a. Samples used were collected in Riverside, Episode B (July 9, 1975).

b. Excludes inorganic compounds.

Table D-10

COMPARISON OF ORGANICS RECOVERED BY SOLVENT EXTRACTION-CARBON ANALYSIS WITH TOTAL ORGANICS BY MSTA

Episode	Station	Total Extractable Carbon ($\mu g/m^3$)[a]	Total Organics by MSTA ($\mu g/m^3$)	$\frac{\text{Total Organics by MSTA}}{\text{Total Extractable Carbon}}$
7/9/75	Pasadena	20.9	11.6	0.56
7/9/75	Pomona	19.1	10.4	0.54
7/9/75	Riverside	16.8	6.7	0.40
7/10/75	Pasadena	17.5	10.6	0.60
7/10/75	Pomona	16.1	8.4	0.52
7/10/75	Riverside	11.0	6.2	0.56
			Mean:	0.53 ± 0.07

$$\frac{\text{Total carbon by MSTA}^{b}}{\text{Total extractable carbon}} = 0.3$$

a. The sum BEC + MCC

b. Assuming organics to be 60% carbon (see Table E-2)

Table D-11

COMPARISON OF TOTAL ORGANICS IN CYCLOHEXANE EXTRACTS BY MSTA WITH CYCLOHEXANE EXTRACTABLE CARBON

Episode	Station	Cyclohexane Extractable Carbon ($\mu g/m^3$)	Total Organics by MSTA ($\mu g/m^3$)	$\frac{\text{Total Organics by MSTA}}{\text{Cyclohexane Extractable C}}$
7/9/75	Pasadena	6.3	6.1	0.97
7/9/75	Pomona	6.5	7.5	1.15
7/9/75	Riverside	4.4	3.2	0.73
7/10/75	Pasadena	4.1	3.6	0.88
7/10/75	Pomona	5.6	2.8	0.50
7/10/75	Riverside	2.9	2.2	0.76
				0.83 ± .22

$$\frac{\text{carbon by MSTA}^{a}}{\text{cyclohexane extractable C}} = 0.6$$

a. For the 6 most abundant compounds in the cyclohexane extracts the % carbon averaged 70%. This ratio assumes this value.

appears to recover about 60% of the cyclohexane extractable carbon. The 40% difference may be relatable to errors in MSTA response factors. Work is continuing to improve the accuracy of the MSTA technique.

Appendix E

MSTA Data for Filter Samples

The minimum response that can be measured by MSTA (Area = 1000), converted into minimum detectable concentration, is different for each compound, amount of sample analyzed, and instrument sensitivity on the day analyzed. Table E-1 lists minimum detectable concentrations, in $\mu g/m^3$, for compounds with Response Factor (R.F.) values of 1.0. Minimum detectable concentrations for all the compounds discussed in this report may be obtained by dividing the values shown in Table E-1 by the R.F. values listed in Table 6 (p 28). Minimum concentrations for reliable quantitation are approximately four times the minimum detectable values.

Table E-2 lists the 13 most abundant compounds and/or fragments observed in ambient samples in order of decreasing abundance. Table E-3 lists the fragments observed in blank Gelman AE filters and the ratio of peak areas in a typical 2-hour sample to the level on the blank. In general, the blank correction represents a small fraction of the observed peaks. The notable exceptions include $C_7H_7NO_4$ (a possible toluene oxidation product) and $C_5H_9NO_5$, identified as an acid nitrate.

Table E-4 compiles the diurnal changes in concentration for all compounds and fragments determined by MSTA. Data missing from the compilation are indicated by either a dash (-) to indicate no mass fragment detected, or a zero (0) to indicate nothing left after subtracting filter blank.

Table E-1

MINIMUM DETECTABLE CONCENTRATIONS BY MSTA FOR COMPOUNDS WITH RESPONSE FACTOR 1.0 ($\mu g/m^3$)[a]

Time (PDT)	Pasadena		Pomona		Riverside	
	July 9	July 10	July 9	July 10	July 9	July 10
7-21	.026	.025	.026	.026	.022	.022
7- 9	.17	.04	.076	.10	.040	.10
9-11	.12	.04	.10	.10	.040	.083
11-13	.043	.04	.10	.10	.050	.10
13-15	.18	.04	.10	.050	.10	.083
15-17	.18	.04	.10	.10	.027	.077
17-19	.18	.04	.10	.10	.083	.077
19-21	.12	.04	.10	.10	.083	.040

a. Divide the numbers given by the Response Factor (Table 6) to get minimum detectable concentrations for other compounds.

Table E-2

ORGANICS LISTED IN APPROXIMATE ORDER OF DECREASING ABUNDANCE IN AMBIENT SAMPLES

Fragment	Rank	Probable Structure	% Carbon
$C_4H_8O_2$	1	pentanedioic acid	45
$C_5H_8O_2$	2	hexanedioic acid	49
$C_8H_5O_3$	3	phthalates	67
$C_6H_{10}O_2$	4	methylhexanedioic acid	53
CHNO	5	?	ca. 70
$C_2H_4O_2$	6	total acids	> 40
C_5H_9	7	total alkanes	87
C_2H_2N	8	?	> 60
$C_4H_8N_2$	9	?	57
$C_4H_9N_2$	10	?	56
$C_3H_5N_2$	11	?	> 57
$C_5H_{10}O_3$	12	?	51
$C_5H_7NO_4$	13	?	41
		Mean:	58[a]

a. Excludes lower limit values.

Table E-3

Filter Blank Correction for MSTA

	Gross Amount Detected[a] / Blank Amount
C_6H_{13} Alkanes, high mw	4
C_6H_{11} Alkenes, med mw	14
C_6H_{11} Alkenes, high mw	4
C_7H_8O Hydroxytoluene + Benzyl Alcohol	5
CONH	5
$C_4H_8N_2$	5
$C_7H_7NO_4$	1
$C_8H_5O_3$ Phthalates	12
$C_5H_9NO_5$	2
C_5H_5Cl Heptachlor?	1

a. In a typical 2-hour sample.

Table E-4

MSTA DATA FOR FILTER SAMPLE

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 9, 1975, at Pasadena (Caltech)

ALIPHATIC HYDROCARBONS

TIME (PDT)	C_5H_{11} Total Alkanes	C_6H_{13} Alkanes, Low Molec Wt	C_6H_{13} Alkanes, Med MW	C_6H_{13} Alkanes, High MW	C_5H_9 Total Alkenes	C_6H_{11} Alkenes, Low MW	C_6H_{11} Alkenes, Med MW	C_6H_{11} Alkenes, High MW
7-21	.19	.05	.074	.009	.49	.028	.16	.107
7-9	.30	.03	.07	-	.51	0	.20	.033
9-11	.36	.10	.10	-	.68	.07	.18	.07
11-13	.28	0	.10	.11	.72	0	.15	.34
13-15	.20	0	.15	.037	.88	.05	.26	.15
15-17	.20	0	.11	-	.81	0	.25	.14
17-19	.01	-	0	-	.46	.009	.18	.06
19-21	.10	0	.076	-	.42	.023	.19	.07

AROMATIC HYDROCARBONS

TIME (PDT)	C_7H_7 Xylenes, Alkyl Benzenes	C_8H_{10} Xylenes, Ethyl Benzenes	C_9H_{11} Alkyl Benzenes	C_9H_{12} Alkyl Benzenes	$C_{10}H_{14}$ Alkyl Benzenes
7-21	.19	.047	.096	.040	.0043
7-9	.06	-	-	-	-
9-11	.15	0	.175	-	-
11-13	.19	.087	.102	.063	.058
13-15	.27	-	-	.025	-
15-17	.11	.091	.075	-	-
17-19	.07	-	0	-	-
19-21	.13	-	.002	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 9 , 1975, at Pasadena (Caltech)

POLYCYCLIC HYDROCARBONS

TIME (PDT)	C_8H_8 Tetrahydro-naphthalene	C_9H_{10} Indan	$C_{10}H_8$ Naphthalene	$C_{10}H_{18}$ Perhydro-naphthalene	$C_{11}H_{10}$ Methyl-naphthalenes	$C_{11}H_{13}$ Dimethyltetra-hydronaphthalene	$C_{14}H_{10}$ Anthracene & Phenanthrene	$C_{16}H_{10}$ Pyrene & Isomers
7-21	.061	.0049	.016	.041	-	.0083	.0010	-
7-9	-	-	-	-	-	-	-	-
9-11	-	-	.0024	-	-	.017	-	-
11-13	.10	.011	.008	.019	-	.0075	-	-
13-15	.026	-	.020	-	-	-	-	-
15-17	-	-	.019	-	-	-	-	-
17-19	-	-	-	-	-	-	-	-
19-21	.039	-	.0058	-	.014	-	-	-

OXYGENATED AROMATICS

TIME (PDT)	$C_6H_4O_2$ Benzoquinone?	C_6H_5O Phenol + NO_2,CHO,COOH?	C_6H_6O Phenol	$C_6H_6O_2$ Dihydroxy-benzenes	C_7H_6O Benzaldehyde + Interference	C_7H_8O Hydroxytoluene + Benzyl Alcohol	$C_9H_{12}O$ Trimethylphenol + Isomers	$C_{12}H_{10}O_2$ Biphenol	$C_{14}H_{21}O$ Dibutyl-methylphenol
7-21	-	.014	.021	.083	-	.049	.022	.015	.0088
7-9	-	.02	-	-	-	-	-	-	-
9-11	-	-	.07	.16	-	.045	.034	-	-
11-13	-	-	.004	.10	0	.036	.010	-	-
13-15	-	-	0	.053	-	.13	.046	-	-
15-17	-	.14	.006	-	-	.008	.11	-	-
17-19	-	.10	-	-	-	.011	-	-	-
19-21	-	-	0	.014	-	0	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 9, 1975, at Pasadena (Caltech)

TIME (PDT)	CARBOXYLIC ACIDS								
	$C_2H_4O_2$ Total acids (as Acetic)	$C_4H_6O_2$ Pentanedioic Acid	$C_5H_8O_2$ Hexanedioic Acid	$C_6H_{10}O_2$ Methylhexanedioic Acid	C_7H_5O Benzoyl Ion	$C_7H_6O_2$ Benzoic Acid	$C_8H_8O_2$ Methylbenzoic Isomers	$C_9H_{10}O_2$ Ethylbenzoic Isomers	$C_{10}H_{12}O_2$ Trimethylbenzoic Isomers
7-21	.50	1.6	1.4	1.0	.14	.005	.091	.019	-
7-9	.06	-	-	-	0	.14	-	-	-
9-11	.47	1.3	2.5	.89	0	0	-	-	-
11-13	.46	1.6	1.6	.64	.11	0	-	.025	.0050
13-15	.84	1.2	4.8	1.7	.36	-	-	-	-
15-17	.64	.97	2.7	2.0	.87	.57	-	-	-
17-19	.41	.64	.47	-	0	.76	-	-	-
19-21	.41	2.2	-	-	.12	-	-	-	-

TIME (PDT)	SECONDARY DIFUNCTIONALS								
	$C_5H_8O_3$ Cyclohexene product?	$C_5H_{10}O_2$ Cyclohexene product?	$C_5H_{10}O_3$ Isomers	$C_6H_8O_2$ 1-heptene product?	$C_6H_{12}O_3$ Isomers	$C_7H_{10}O_2$ Isomers	$C_7H_{12}O_2$ Isomers	$C_7H_{12}O_3$ Isomers	$C_8H_5O_3$ Phthalates
7-21	.14	-	.067	.65	.041	.12	.14	.062	1.1
7-9	-	-	-	.16	-	-	-	-	1.1
9-11	-	-	1.4	1.2	.59	-	-	.096	2.0
11-13	-	-	-	.88	-	.28	.27	-	2.0
13-15	-	-	-	.14	-	-	.18	-	2.0
15-17	-	-	-	-	.65	.58	-	-	.66
17-19	-	-	.19	.23	-	-	-	-	1.9
19-21	-	-	.11	-	-	-	-	-	1.6

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Pasadena (Caltech)

SECONDARY DIFUNCTIONALS WITH NITROGEN

TIME (PDT)	$C_5H_7NO_4$ $HCO(CH_2)_3COONO$	$C_5H_7NO_5$ $HOOC(CH_2)_3COONO$	$C_5H_7NO_6$ Isomers	$C_5H_9NO_4$ $HCO(CH_2)_4ONO_2$ + Isomers	$C_5H_9NO_5$ $HOOC(CH_2)_4ONO_2$	$C_6H_9NO_4$ $HCO(CH_2)_4COONO$	$C_6H_9NO_5$ $HOOC(CH_2)_4COONO$	$C_6H_9NO_6$ Isomers
7-21	-	.018	-	.30	.026	-	-	-
7-9	.65	-	-	-	-	-	-	-
9-11	.12	-	-	-	-	-	-	-
11-13	-	-	-	-	-	-	-	-
13-15	.60	-	-	.42	.21	-	-	-
15-17	1.4	-	-	-	-	-	-	-
17-19	.33	-	-	-	.15	-	-	-
19-21	.23	-	.13	-	-	-	-	-

SECONDARY DIFUNCTIONALS WITH NITROGEN (cont.)

TIME (PDT)	$C_6H_{11}NO_4$ $HCO(CH_2)_5ONO_2$ + Isomers	$C_6H_{11}NO_5$ $HOOC(CH_2)_5ONO_2$	$C_7H_{11}NO_5$ $HOOC(CH_2)_5COONO$	$C_7H_{13}NO_4$ $HCO(CH_2)_6ONO_2$ + Isomers	$C_7H_{13}NO_5$ $HOOC(CH_2)_6ONO_2$ + Isomers
7-21	.018	-	.031	-	-
7-9	-	-	-	-	-
9-11	-	-	-	-	-
11-13	-	-	-	-	-
13-15	-	-	-	-	-
15-17	.16	-	-	-	-
17-19	-	-	-	-	-
19-21	-	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Pasadena (Caltech)

NITROGEN COMPOUNDS

TIME (PDT)	CH_2CN Fragment (relative)	CONH Fragment (relative)	$C_3H_5N_2$ Fragment (relative)	CH_2NO_3 Fragment (relative)	$C_4H_8N_2$ Fragment (relative)	$C_4H_9N_2$ Fragment (relative)	C_5H_5N Pyridine & Pyridyls	$C_5H_{10}N$ Piperidines + Isomers
7-21	.10	2.5	0	-	-	-	-	.010
7-9	.35	0	.7	.11	.04	.94	.026	.028
9-11	-	0	.47	-	.12	2.5	.030	.030
11-13	.22	2.5	.05	-	-	-	-	.015
13-15	2.6	0	.09	-	1.3	1.6	-	.056
15-17	1.7	3.8	.6	-	.23	.16	-	.097
17-19	4.1	0	.4	-	.26	.70	.11	-
19-21	1.4	5.2	.17	-	.86	1.1	.044	.089

NITROGEN COMPOUNDS (cont.)

TIME (PDT)	$C_7H_7NO_3$ Hydroxynitro-toluene	$C_7H_7NO_4$ Toluene oxidn. prod.	C_9H_7N Quinoline?	$C_{10}H_7NO_2$ Nitro-naphthalene	$C_{12}H_9N$ Carbazole	$C_{13}H_9N$ Acridine + Isomers
7-21	.0028	-	.0034	-	.0085	-
7-9	-	0	-	-	-	-
9-11	-	0	-	-	-	-
11-13	-	-	.0036	-	-	-
13-15	-	-	.032	-	-	-
15-17	-	.003	.017	-	-	-
17-19	-	0	-	-	-	-
19-21	-	0	.028	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Pasadena (Caltech)

TIME (PDT)	Sulfates as Sulfuric acid	INORGANICS Ammonium Chloride	Ammonium Nitrate	CHLORINATED COMPOUNDS $C_{12}H_5Cl_3$ PCB?	$C_7H_4Cl_3$ Isodrin	$C_6H_4Cl_3$ Lindane	C_5H_5Cl Heptachlor?
7-21	6.6	.22	9.9	-	-	-	-
7-9	8.7	1.3	3.5	-	-	-	-
9-11	5.2	1.3	7.3	-	-	-	-
11-13	4.6	.32	>20	-	-	-	-
13-15	4.9	1.9	14.2	-	.20	-	-
15-17	2.6	1.0	1.3	-	.16	-	-
17-19	2.0	1.4	1.1	-	-	-	-
19-21	3.7	.62	.7	-	.092	-	-

TENTATIVE TERPENE PRODUCTS

TIME (PDT)	$C_9H_{14}O_2$ Isomers	$C_{10}H_{14}O_3$ Isomers	$C_{10}H_{16}O_2$ Isomers	$C_{10}H_{16}O_3$ (Pinonic Acid?)
7-21	.085	-	-	-
7-9	-	-	-	-
9-11	-	-	-	-
11-13	.097	-	-	-
13-15	-	-	-	-
15-17	-	-	-	-
17-19	-	-	-	-
19-21	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Pomona, California

ALIPHATIC HYDROCARBONS

TIME (PDT)	C_5H_{11} Total Alkanes	C_6H_{13} Alkanes, Low Molec Wt	C_6H_{13} Alkanes, Med MW	C_6H_{13} Alkanes, High MW	C_5H_9 Total Alkenes	C_6H_{11} Alkenes, Low MW	C_6H_{11} Alkenes, Med MW	C_6H_{11} Alkenes, High MW
7-21	.18	.029	.007	.026	.49	.020	.18	.11
7-9	.19	0	.10	.025	.49	.053	.12	.12
9-11	.13	0	.15	-	.74	.05	.30	.25
11-13	.05	0	.095	.081	.81	.056	.22	.16
13-15	.17	.005	.13	.010	.73	.046	.27	.14
15-17	.21	0	.22	-	.92	.078	.25	.20
17-19	.32	.014	.12	.037	.85	.03	.29	.14
19-21	.31	.006	.19	.014	.82	.006	.29	.25

AROMATIC HYDROCARBONS

TIME (PDT)	C_7H_7 Xylenes, Alkyl Benzenes	C_8H_{10} Xylenes, Alkyl Benzenes	C_9H_{11} Alkyl Benzenes	C_9H_{12} Alkyl Benzenes	$C_{10}H_{14}$ Alkyl Benzenes
7-21	.18	.091	.098	.035	.024
7-9	.17	.049	.061	.018	.019
9-11	.34	.10	.145	.091	.026
11-13	.29	.17	.175	.11	.063
13-15	.30	.075	.126	.038	-
15-17	.35	.070	.175	.050	-
17-19	.26	.037	.105	.085	.017
19-21	.30	-	.128	.089	.036

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 9, 1975, at Pomona, California

POLYCYCLIC HYDROCARBONS

TIME (PDT)	C_8H_8 Tetrahydronaphthalene	C_9H_{10} Indan	$C_{10}H_8$ Naphthalene	$C_{10}H_{18}$ Perhydronaphthalene	$C_{11}H_{10}$ Methylnaphthalenes	$C_{11}H_{13}$ Dimethyltetrahydronaphthalene	$C_{14}H_{10}$ Anthracene & Phenanthrene	$C_{16}H_{10}$ Pyrene & Isomers
7-21	.082	-	.014	.050	.010	.0069	-	.0026
7-9	.085	-	.013	.14	.044	.028	-	-
9-11	.21	-	.006	-	.010	.048	.0046	.038
11-13	.25	.0097	.035	-	-	.015	-	-
13-15	.19	-	-	-	-	.059	-	-
15-17	.18	.068	.016	.052	-	.0095	-	-
17-19	.10	.046	.0051	.026	.0076	.054	-	-
19-21	.044	.018	-	-	.022	.019	-	-

OXYGENATED AROMATICS

TIME (PDT)	$C_6H_4O_2$ Benzoquinone?	C_6H_5O Phenol + NO_2,CHO,COOH?	C_6H_6O Phenol	$C_6H_6O_2$ Dihydroxybenzenes	C_7H_6O Benzaldehyde + Interference	C_7H_8O Hydroxytoluene + Benzyl Alcohol	$C_9H_{12}O$ Trimethylphenol + Isomers	$C_{12}H_{10}O_2$ Biphenol	$C_{14}H_{21}O$ Dibutylmethylphenol
7-21	-	-	.021	.047	-	.008	-	.040	.015
7-9	-	1.4	.019	.083	.039	.015	-	-	-
9-11	-	.44	.048	.12	.057	.072	.037	-	-
11-13	.014	.36	.08	.12	-	.066	-	-	-
13-15	-	.19	.032	.081	-	.065	-	-	.033
15-17	-	.47	.067	.091	.038	.084	-	-	-
17-19	0	-	0	.072	-	.051	.054	.016	-
19-21	.033	.044	0	.14	-	.018	.046	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Pomona, California

CARBOXYLIC ACIDS

TIME (PDT)	$C_2H_4O_2$ Total Acids (as acetic)	$C_4H_6O_2$ Pentanedioic Acid	$C_5H_8O_2$ Hexanedioic Acid	$C_6H_{10}O_2$ Methylhexanedioic Acid	C_7H_5O Benzoyl Ion	$C_7H_6O_2$ Benzoic Acid	$C_8H_8O_2$ Methylbenzoic Isomers	$C_9H_{10}O_2$ Ethylbenzoic Isomers	$C_{10}H_{12}O_2$ Trimethylbenzoic Isomers
7-21	.40	1.4	1.6	.49	.22	.044	.0099	.022	-
7-9	.37	.20	.34	.34	0	0	.026	-	-
9-11	.72	4.1	1.5	.47	0	0	.081	.075	-
11-13	.68	3.5	3.5	1.5	0	0	-	.058	-
13-15	.58	4.4	3.4	.74	0	0	.029	-	-
15-17	.71	1.8	4.2	.97	0	0	.065	.032	.020
17-19	.82	2.6	2.9	1.8	.28	0	.018	.025	.016
19-21	.64	2.4	1.3	.88	.30	0	-	-	.069

SECONDARY DIFUNCTIONALS

TIME (PDT)	$C_5H_8O_3$ Cyclohexene product?	$C_5H_{10}O_2$ Cyclohexene product?	$C_5H_{10}O_3$ Isomers	$C_6H_8O_2$ 1-heptene product?	$C_6H_{12}O_3$ Isomers	$C_7H_{10}O_2$ Isomers	$C_7H_{12}O_2$ Isomers	$C_7H_{12}O_3$ Isomers	$C_8H_5O_3$ Phthalates
7-21	.074	-	-	.21	.048	.35	.16	-	1.2
7-9	-	.076	.26	1.0	.10	.34	-	-	1.4
9-11	-	-	-	1.1	-	1.1	-	.16	2.0
11-13	.81	.11	-	1.1	-	.22	.34	.13	1.7
13-15	.13	-	-	.42	-	.22	.14	.16	1.3
15-17	.37	-	-	1.4	.17	.71	.38	-	1.4
17-19	.10	-	-	1.2	-	.65	.48	-	2.0
19-21	-	-	-	.81	-	.37	-	.13	1.9

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 9, 1975, at Pomona, California

SECONDARY DIFUNCTIONALS WITH NITROGEN

TIME (PDT)	$C_5H_7NO_4$ $HCO(CH_2)_3COONO$	$C_5H_7NO_5$ $HOOC(CH_2)_3COONO$	$C_5H_7NO_6$ Isomers	$C_5H_9NO_4$ $HCO(CH_2)_4ONO_2$ + Isomers	$C_5H_9NO_5$ $HOOC(CH_2)_4ONO_2$	$C_6H_9NO_4$ $HCO(CH_2)_4COONO$	$C_6H_9NO_5$ $HOOC(CH_2)_4COONO$	$C_6H_9NO_6$ Isomers
7-21	-	-	-	-	.029	-	-	-
7-9	-	-	-	-	-	-	.099	-
9-11	-	-	-	-	.23	-	-	-
11-13	-	-	.16	.23	-	-	-	-
13-15	-	.05	-	-	.12	-	-	-
15-17	-	.033	-	-	-	-	-	-
17-19	-	-	-	.064	-	-	-	-
19-21	-	-	-	-	-	-	-	-

SECONDARY DIFUNCTIONALS WITH NITROGEN (cont.)

TIME (PDT)	$C_6H_{11}NO_4$ $HCO(CH_2)_5ONO_2$ + Isomers	$C_6H_{11}NO_5$ $HOOC(CH_2)_5ONO_2$	$C_7H_{11}NO_5$ $HOOC(CH_2)_5COONO$	$C_7H_{13}NO_4$ $HCO(CH_2)_6ONO_2$ + Isomers	$C_7H_{13}NO_5$ $HOOC(CH_2)_6ONO_2$ + Isomers
7-21	.045	.042	-	.082	.018
7-9	-	-	-	-	-
9-11	-	-	-	-	-
11-13	-	-	-	-	-
13-15	-	-	-	-	-
15-17	-	-	-	-	-
17-19	.054	-	-	-	-
19-21	-	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Pomona, California

NITROGEN COMPOUNDS

TIME (PDT)	CH_2CN fragment (relative)	CONH fragment (relative)	$C_3H_5N_2$ fragment (relative)	CH_2NO_3 fragment (relative)	$C_4H_8N_2$ fragment (relative)	$C_4H_9N_2$ fragment (relative)	C_5H_5N Pyridine & Pyridyls	$C_5H_{10}N$ Piperidined & Isomers
7-21	.18	2.2	0	-	-	.024	.0037	.0098
7-9	-	1.7	-	-	-	-	-	-
9-11	.44	4.3	.22	-	-	.11	.0082	.038
11-13	-	1.4	.07	-	.77	-	-	.070
13-15	.61	3.6	0	-	1.4	.30	-	-
15-17	.14	2.5	-	-	-	-	.0069	.059
17-19	.49	3.1	0	-	-	-	-	.037
19-21	.14	3.0	.10	-	-	.13	-	.018

NITROGEN COMPOUNDS (cont.)

TIME (PDT)	$C_7H_7NO_3$ Hydroxynitro-toluene	$C_7H_7NO_4$ Toluene oxidn. prod.	C_9H_7N Quinoline?	$C_{10}H_7NO_2$ Nitro-naphthalene	$C_{12}H_9N$ Carbazole	$C_{13}H_9N$ Acridine & Isomers
7-21	-	-	.0035	.0017	.012	-
7-9	-	-	-	-	-	-
9-11	-	0	.0084	-	-	-
11-13	-	-	-	-	.0055	-
13-15	-	-	-	-	-	-
15-17	-	.003	.045	-	-	-
17-19	-	-	.041	-	.011	-
19-21	-	-	-	-	-	.015

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Pomona, California

TIME (PDT)	INORGANICS			CHLORINATED COMPOUNDS			
	Sulfates as Sulfuric Acid	Ammonium Chloride	Ammonium Nitrate	$C_{12}H_5Cl_3$ PCB?	$C_7H_4Cl_3$ Isodrin	$C_6H_4Cl_3$ Lindane	C_5H_5Cl Heptachlor?
7-21	6.0	>.53	11.	-	-	.026	-
7-9	8.2	.65	1.7	-	-	0	0
9-11	11.7	4.0	32	-	-	.47	0
11-13	2.9	2.2	4.8	-	-	0	0
13-15	3.6	1.5	3.3	-	-	0	0
15-17	4.0	1.1	2.4	-	-	0	0
17-19	4.9	1.2	3.5	-	-	-	-
19-21	6.2	1.0	4.5	-	-	0	0

TENTATIVE TERPENE PRODUCTS

TIME (PDT)	$C_9H_{14}O_2$ Isomers	$C_{10}H_{14}O_3$ Isomers	$C_{10}H_{16}O_2$ Isomers	$C_{10}H_{16}O_3$ Pinonic Acid ?
7-21	.034	.045	-	-
7-9	-	.32	-	-
9-11	-	-	.12	-
11-13	-	-	-	-
13-15	-	-	-	-
15-17	.35	-	-	-
17-19	.20	-	-	-
19-21	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Riverside, California

ALIPHATIC HYDROCARBONS

TIME (PDT)	C_5H_{11} Total Alkanes	C_6H_{13} Alkanes, Low Molec Wt	C_6H_{13} Alkanes, Med MW	C_6H_{13} Alkanes, High MW	C_5H_9 Total Alkenes	C_6H_{11} Alkenes, Low MW	C_6H_{11} Alkenes, Med MW	C_6H_{11} Alkenes, High MW
7-21	.06	0	.034	.022	.22	-	.068	.088
7-9	.13	.02	.04	.01	.39	.02	.11	.09
9-11	.25	.046	.14	.06	.53	.04	.25	.16
11-13	.11	.013	.047	-	.46	.055	.08	.076
13-15	.45	.08	.068	.09	1.04	.059	.19	.51
15-17	.15	.031	.077	.0050	.51	.040	.16	.072
17-19	.07	0	.015	-	.56	.024	.077	.10
19-21	.49	.08	.26	.036	.95	.083	.32	.36

AROMATIC HYDROCARBONS

TIME (PDT)	C_7H_7 Xylenes, Alkyl Benzenes	C_8H_{10} Xylenes, Ethyl Benzenes	C_9H_{11} Alkyl Benzenes	C_9H_{12} Alkyl Benzenes	$C_{10}H_{14}$ Alkyl Benzenes
7-21	.09	.018	.037	.0040	-
7-9	.17	0	.093	-	-
9-11	.20	.02	.093	.077	.011
11-13	.21	0	.060	.030	.18
13-15	.55	.017	.005	.025	-
15-17	.09	0	.057	.0038	-
17-19	.10	-	0	-	-
19-21	.50	.14	.193	.035	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 9, 1975, at Riverside, California

POLYCYCLIC HYDROCARBONS

TIME (PDT)	C_8H_8 Tetrahydro-naphthalene	C_9H_{10} Indan	$C_{10}H_8$ Naphthalene	$C_{10}H_{18}$ Perhydro-naphthalene	$C_{11}H_{10}$ Methyl-naphthalenes	$C_{11}H_{13}$ Dimethyltetra-hydronaphthalene	$C_{14}H_{10}$ Anthracene & Phenanthrene	$C_{16}H_{10}$ Pyrene & Isomers
7-21	.050	.0040	.0063	-	-	.014	-	-
7-9	.061	.0057	.003	-	-	.010	-	-
9-11	.18	.024	.031	-	.025	-	-	.0069
11-13	.12	.026	.005	-	-	-	-	-
13-15	-	.020	-	.067	-	-	-	-
15-17	.096	.0048	.015	-	-	.0030	-	-
17-19	-	.010	-	-	-	-	-	-
19-21	.15	.049	.022	-	-	.022	-	-

OXYGENATED AROMATICS

TIME (PDT)	$C_6H_4O_2$ Benzoquinone?	C_6H_5O Phenol + NO_2,CHO,COOH?	C_6H_6O Phenol	$C_6H_6O_2$ Dihydroxy-benzenes	C_7H_6O Benzaldehyde + Interference	C_7H_8O Hydroxytoluene + Benzyl Alcohol	$C_9H_{12}O$ Trimethylphenol + Isomers	$C_{12}H_{10}O_2$ Biphenol	$C_{14}H_{21}O$ Dibutyl-methylphenol
7-21	-	.040	.014	.040	.0052	.024	-	-	-
7-9	-	.106	.016	.027	-	.027	.011	-	-
9-11	-	.29	.086	.072	.0003	.034	.083	.010	.012
11-13	-	.37	.016	.037	.013	.033	.027	-	.027
13-15	.014	.24	.09	.10	-	.051	.078	.061	-
15-17	-	.29	.07	.063	.0044	.042	.013	.0075	-
17-19	-	.20	0	.027	-	-	.043	-	-
19-21	.027	.50	.16	.077	0	.091	.035	-	.10

CONCENTRATIONS (μg/m³) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Riverside, California

CARBOXYLIC ACIDS

TIME (PDT)	$C_2H_4O_2$ Total Acids (as acetic)	$C_4H_6O_2$ Pentanedioic Acid	$C_5H_8O_2$ Hexanedioic Acid	$C_6H_{10}O_2$ Methylhexanedioic Acid	C_7H_5O Benzoyl Ion	$C_7H_6O_2$ Benzoic Acid	$C_8H_8O_2$ Methylbenzoic Isomers	$C_9H_{10}O_2$ Ethylbenzoic Isomers	$C_{10}H_{12}O_2$ Trimethylbenzoic Isomers
7-21	.27	.84	.88	.40	0	0	.0082	-	-
7-9	.26	.29	1.0	.55	0	0	-	-	-
9-11	.68	1.9	1.9	.62	0	0	.043	.029	-
11-13	.71	3.0	3.8	1.1	.1	0	.030	-	-
13-15	.92	2.1	3.0	.46	.9	.13	-	-	-
15-17	.82	1.7	1.4	1.2	.15	0	-	.016	-
17-19	.23	.96	1.0	-	0	0	-	-	-
19-21	1.0	2.9	3.4	.44	0	0	.038	-	-

SECONDARY DIFUNCTIONALS

TIME (PDT)	$C_5H_8O_3$ Cyclohexene product?	$C_5H_{10}O_2$ Cyclohexene product?	$C_5H_{10}O_3$ Isomers	$C_6H_8O_2$ 1-heptene product?	$C_6H_{12}O_3$ Isomers	$C_7H_{10}O_2$ Isomers	$C_7H_{12}O_2$ Isomers	$C_7H_{12}O_3$ Isomers	$C_8H_5O_3$ Phthalates
7-21	-	-	.060	.49	-	.10	-	.075	.43
7-9	-	-	-	.53	-	.040	.036	-	.96
9-11	.086	-	.090	.87	-	.30	-	-	1.5
11-13	.10	-	.17	.85	-	.67	.087	.14	1.9
13-15	.18	-	-	.20	-	.15	-	-	1.9
15-17	.037		-	.76	-	.42	.13	-	1.5
17-19	-	-	-	.14	-	-	-	-	.80
19-21	-	-	-	1.1	-	.66	.092	-	2.5

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Riverside, California

SECONDARY DIFUNCTIONALS WITH NITROGEN

TIME (PDT)	$C_5H_7NO_4$ $HCO(CH_2)_3COONO$	$C_5H_7NO_5$ $HOOC(CH_2)_3COONO$	$C_5H_7NO_6$ Isomers	$C_5H_9NO_4$ $HCO(CH_2)_4ONO_2$ + Isomers	$C_5H_9NO_5$ $HOOC(CH_2)_4ONO_2$	$C_6H_9NO_4$ $HCO(CH_2)_4COONO$	$C_6H_9NO_5$ $HOOC(CH_2)_4COONO$	$C_6H_9NO_6$ Isomers
7-21	-	-	-	.13	-	-	-	-
7-9	.040	-	-	-	-	-	-	-
9-11	-	-	-	.052	-	-	-	-
11-13	-	-	-	-	.16	-	-	-
13-15	-	-	-	-	-	-	-	-
15-17	-	-	-	.059	.021	-	-	-
17-19	-	-	-	-	-	-	-	-
19-21	-	-	-	.14	.07	-	-	-

SECONDARY DIFUNCTIONALS WITH NITROGEN (cont.)

TIME (PDT)	$C_6H_{11}NO_4$ $HCO(CH_2)_5ONO_2$ + Isomers	$C_6H_{11}NO_5$ $HOOC(CH_2)_5ONO_2$	$C_7H_{11}NO_5$ $HOOC(CH_2)_5COONO$	$C_7H_{13}NO_4$ $HCO(CH_2)_6ONO_2$ + Isomers	$C_7H_{13}NO_5$ $HOOC(CH_2)_6ONO_2$ + Isomers
7-21	-	-	-	.035	-
7-9	-	-	-	.040	-
9-11	.10	-	-	-	-
11-13	-	-	-	-	-
13-15	-	-	-	-	-
15-17	-	.026	-	-	-
17-19	-	-	-	-	-
19-21	.22	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 9, 1975, at Riverside, California

NITROGEN COMPOUNDS

TIME (PDT)	CH_2CN fragment (relative)	CONH fragment (relative)	$C_3H_5N_2$ fragment (relative)	CH_2NO_3 fragment (relative)	$C_4H_8N_2$ fragment (relative)	$C_4H_9N_2$ fragment (relative)	C_5H_5N Pyridine & Pyridyls	$C_5H_{10}N$ Piperidines & Isomers
7-21	.14	2.2	0	-	-	-	-	.0037
7-9	-	2.0	-	-	-	.058	.0018	-
9-11	.32	3.0	0	-	-	.12	-	.0071
11-13	.39	4.2	.4	-	-	.38	.17	.19
13-15	.96	9.3	-	-	-	-	-	-
15-17	.34	4.2	-	-	-	-	-	-
17-19	.19	2.7	.25	-	-	-	-	-
19-21	.48	6.9	0	.075	-	.10	.041	.052

NITROGEN COMPOUNDS (cont.)

TIME (PDT)	$C_7H_7NO_3$ Hydroxynitro-toluene	$C_7H_7NO_4$ Toluene oxidn. prod.	C_9H_7N Quinoline?	$C_{10}H_7NO_2$ Nitro-naphthalene	$C_{12}H_9N$ Carbazole	$C_{13}H_9N$ Acridine & Isomers
7-21	-	-	.0040	-	-	-
7-9	-	-	-	-	-	-
9-11	-	-	-	-	-	-
11-13	-	.009	.0068	-	-	-
13-15	-	-	.026	-	-	-
15-17	-	-	-	-	-	-
17-19	-	-	.012	-	-	-
19-21	-	-	.025	-	-	.023

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 9, 1975, at Riverside, California

TIME (PDT)	INORGANICS: Sulfates as Sulfuric Acid	Ammonium Chloride	Ammonium Nitrate	CHLORINATED COMPOUNDS: $C_{12}H_5Cl_3$ PCB?	$C_7H_4Cl_3$ Isodrin	$C_6H_4Cl_3$ Lindane	C_5H_5Cl Heptachlor?
7-21	1.7	.35	>15	.017	-	-	-
7-9	4.8	1.9	9.5	-	-	-	0
9-11	5.0	3.2	>40	-	-	0	-
11-13	4.9	2.6	24.	-	-	-	-
13-15	4.3	1.8	>30	-	-	0	0
15-17	3.5	.40	1.8	-	-	-	-
17-19	2.5	1.5	11.7	-	-	0	-
19-21	7.1	3.2	>40.	-	-	0	0

TENTATIVE TERPENE PRODUCTS

TIME (PDT)	$C_9H_{14}O_2$ Isomers	$C_{10}H_{14}O_3$ Isomers	$C_{10}H_{16}O_2$ Isomers	$C_{10}H_{16}O_3$ Pinonic Acid?
7-21	-	-	-	-
7-9	-	-	-	-
9-11	-	.026	-	-
11-13	-	-	-	-
13-15	-	-	-	-
15-17	-	-	-	-
17-19	-	-	-	-
19-21	-	.12	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 10, 1975, at Pasadena (Caltech)

ALIPHATIC HYDROCARBONS

TIME (PDT)	C_5H_{11} Total Alkanes	C_6H_{13} Alkanes, Low Molec Wt	C_6H_{13} Alkanes, Med MW	C_6H_{13} Alkanes, High MW	C_5H_9 Total Alkenes	C_6H_{11} Alkenes, Low MW	C_6H_{11} Alkenes, Med MW	C_6H_{11} Alkenes, High MW
7-21	.14	.008	.083	.039	.38	-	.096	.16
7-9	.14	.03	.08	.03	.49	0	.21	.10
9-11	.16	.04	.05	.003	.57	.06	.11	.09
11-13	.29	.07	.05	.006	.77	.07	.22	.15
13-15	.31	.01	.12	.027	.86	0	.32	.19
15-17	.17	.05	.026	-	.53	.02	.19	.09
17-19	.20	.04	.07	.01	.49	.027	.21	.09
19-21	.22	.06	.04	-	.43	.056	.16	.07

AROMATIC HYDROCARBONS

TIME (PDT)	C_7H_7 Xylenes, Alkyl Benzenes	C_8H_{10} Xylenes, Alkyl Benzenes	C_9H_{11} Alkyl Benzenes	C_9H_{12} Alkyl Benzenes	$C_{10}H_{14}$ Alkyl Benzenes	$C_{12}H_{10}$ Biphenyl
7-21	.16	.066	.095	.066	.056	-
7-9	.19	.02	.007	-	-	.0035
9-11	.21	.003	.065	-	.020	-
11-13	.27	.07	.096	.029	.011	-
13-15	.27	.15	.131	.089	.024	-
15-17	.18	.023	.004	.017	-	-
17-19	.15	.004	.021	.0061	-	-
19-21	.12	-	.049	.0090	-	-

CONCENTRATIONS (μg/m³) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Pasadena (Caltech)

POLYCYCLIC HYDROCARBONS

TIME (PDT)	C_8H_8 Tetrahydro-naphthalene	C_9H_{10} Indan	$C_{10}H_8$ Naphthalene	$C_{10}H_{18}$ Perhydro-naphthalene	$C_{11}H_{10}$ Methyl-naphthalenes	$C_{11}H_{13}$ Dimethyltetra-hydronaphthalene	$C_{14}H_{10}$ Anthracene & Phenanthrene	$C_{16}H_{10}$ Pyrene & Isomers
7-21	.078	.036	.015	.015	.0045	.025	-	-
7-9	.083	-	-	-	.020	.0083	-	-
9-11	.087	.024	.022	-	-	-	-	-
11-13	.083	.021	.025	-	.0068	.064	-	-
13-15	.078	.019	-	.018	.0061	.049	-	-
15-17	.071	.010	.0036	-	-	.0090	-	-
17-19	.025	.012	.0015	-	-	.0054	-	-
19-21	.047	-	.004	-	-	.0070	-	-

OXYGENATED AROMATICS

TIME (PDT)	$C_6H_4O_2$ Benzoquinone?	C_6H_5O Phenol + NO_2,CHO,COOH?	C_6H_6O Phenol	$C_6H_6O_2$ Dihydroxy-benzenes	C_7H_6O Benzaldehyde + Interference	C_7H_8O Hydroxytoluene + Benzyl Alcohol	$C_9H_{12}O$ Trimethylphenol + Isomers	$C_{12}H_{10}O_2$ Biphenol	$C_{14}H_{21}O$ Dibutyl-methylphenol
7-21	.0032	.050	.011	.095	.017	.026	.028	.0059	.010
7-9	-	-	.006	.094	.006	.023	.013	-	-
9-11	-	-	.025	.134	-	.066	-	-	-
11-13	-	.046	.037	.094	.023	.055	.019	-	-
13-15	-	.024	.05	.124	-	.048	.16	.0091	.016
15-17	-	-	.01	.042	-	.05	.047	-	-
17-19	.0087	-	.008	.019	.0089	.016	.044	-	-
19-21	-	.19	.006	.052	0	0	.018	-	-

CONCENTRATIONS (μg/m³) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Pasadena (Caltech)

CARBOXYLIC ACIDS

TIME (PDT)	$C_2H_4O_2$ Total Acids (as acetic)	$C_4H_6O_2$ Pentanedioic Acid	$C_5H_8O_2$ Hexanedioic Acid	$C_6H_{10}O_2$ Methylhexanedioic Acid	C_7H_5O Benzoyl Ion	$C_7H_6O_2$ Benzoic Acid	$C_8H_8O_2$ Methylbenzoic Isomers	$C_9H_{10}O_2$ Ethylbenzoic Isomers	$C_{10}H_{12}O_2$ Trimethylbenzoic Isomers
7-21	.51	1.3	1.8	.94	.14	.02	.022	.041	-
7-9	1.4	2.6	1.2	1.1	.22	0	-	-	-
9-11	1.3	2.0	2.2	1.2	.28	-	.016	-	.012
11-13	.88	1.9	2.9	1.2	.28	0	.028	-	-
13-15	.65	2.8	3.4	2.2	.21	0	.055	.024	-
15-17	.41	2.0	1.3	1.0	.19	-	-	.017	-
17-19	.37	1.5	1.1	.55	.11	-	-	-	-
19-21	.29	.97	.94	.48	0	0	-	-	-

SECONDARY DIFUNCTIONALS

TIME (PDT)	$C_5H_8O_3$ Cyclohexene product?	$C_5H_{10}O_2$ Cyclohexene product?	$C_5H_{10}O_3$ Isomers	$C_6H_8O_2$ 1-heptene product?	$C_6H_{12}O_3$ Isomers	$C_7H_{10}O_2$ Isomers	$C_7H_{12}O_2$ Isomers	$C_7H_{12}O_3$ Isomers	$C_8H_5O_3$ Phthalates
7-21	.018	.12	.077	.62	-	.31	.24	.025	.74
7-9	.060	-	-	.71	-	-	-	-	2.2
9-11	-	-	-	.77	-	.72	.12	-	1.8
11-13	.23	.078	-	.73	-	.54	.44	-	2.1
13-15	.20	-	-	1.3	.084	.74	.23	.062	1.5
15-17	-	-	-	.38	-	.45	.32	-	1.5
17-19	.048	-	-	.79	-	-	-	-	1.8
19-21	-	-	-	.65	-	.17	-	-	2.3

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Pasadena (Caltech)

SECONDARY DIFUNCTIONALS WITH NITROGEN

TIME (PDT)	$C_5H_7NO_4$ $HCO(CH_2)_3COONO$	$C_5H_7NO_5$ $HOOC(CH_2)_3COONO$	$C_5H_7NO_6$ Isomers	$C_5H_9NO_4$ $HCO(CH_2)_4ONO_2$ + Isomers	$C_5H_9NO_5$ $HOOC(CH_2)_4ONO_2$	$C_6H_9NO_4$ $HCO(CH_2)_4COONO$	$C_6H_9NO_5$ $HOOC(CH^2)^4COONO$	$C_6H_9NO_6$ Isomers
7-21	-	-	-	.031	-	-	.044	-
7-9	-	-	.073	.15	-	-	-	-
9-11	-	-	-	.053	.008	-	-	-
11-13	-	-	-	.061	.06	-	-	-
13-15	-	-	-	-	-	-	-	-
15-17	-	-	-	-	-	-	-	-
17-19	-	-	-	-	0	-	-	-
19-21	-	-	-	.048	-	-	-	-

SECONDARY DIFUNCTIONALS WITH NITROGEN (cont.)

TIME (PDT)	$C_6H_{11}NO_4$ $HCO(CH_2)_5ONO_2$ + Isomers	$C_6H_{11}NO_5$ $HOOC(CH_2)_5ONO_2$	$C_7H_{11}NO_5$ $HOOC(CH_2)_5COONO$	$C_7H_{13}NO_4$ $HCO(CH_2)_6ONO_2$ + Isomers	$C_7H_{13}NO_5$ $HOOC(CH_2)_6ONO_2$ + Isomers
7-21	.020	-	.046	.025	-
7-9	-	.073	-	.068	-
9-11	-	-	-	-	-
11-13	-	-	-	.048	-
13-15	-	-	-	-	-
15-17	-	-	-	-	-
17-19	-	-	-	.10	-
19-21	-	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Pasadena (Caltech)

NITROGEN COMPOUNDS

TIME (PDT)	CH_2CN fragment (relative)	CONH fragment (relative)	$C_3H_5N_2$ fragment (relative)	CH_2NO_3 fragment (relative)	$C_4H_8N_2$ fragment (relative)	$C_4H_9N_2$ fragment (relative)	C_5H_5N Pyridine & Pyridyls	$C_5H_{10}N$ Piperidines & Isomers
7-21	.11	1.8	-	-	-	.057	-	-
7-9	.21	1.9	0	-	-	-	-	.025
9-11	.092	1.4	-	.028	-	-	-	.050
11-13	.052	2.2	-	-	-	-	-	.025
13-15	.26	1.5	0	-	-	-	-	.0053
15-17	-	.39	0	-	-	-	-	.0062
17-19	-	.8	-	-	-	.065	-	-
19-21	.092	.7	0	-	-	-	-	.030

NITROGEN COMPOUNDS (cont.)

TIME (PDT)	$C_7H_7NO_3$ Hydroxynitro-toluene	$C_7H_7NO_4$ Toluene oxidn. prod.	C_9H_7N Quinoline?	$C_{10}H_7NO_2$ Nitro-naphthalene	$C_{12}H_9N$ Carbazole	$C_{13}H_9N$ Acridine & Isomers
7-21	.0062	-	.0030	-	.0079	-
7-9	-	-	-	.0023	-	-
9-11	-	-	-	-	.0022	-
11-13	-	-	.013	-	-	-
13-15	-	-	.0029	-	.014	-
15-17	-	-	.014	-	-	-
17-19	-	-	-	-	-	-
19-21	-	-	.0056	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 10, 1975, at Pasadena (Caltech)

	INORGANICS			CHLORINATED COMPOUNDS			
TIME (PDT)	Sulfates as Sulfuric Acid	Ammonium Chloride	Ammonium Nitrate	$C_{12}H_5Cl_3$ PCB?	$C_7H_4Cl_3$ Isodrin	$C_6H_4Cl_3$ Lindane	C_5H_5Cl Heptachlor?
7-21	4.8	.01	5.5	-	-	0	-
7-9	6.0	.31	1.2	-	-	-	0
9-11	3.7	.87	4.6	-	-	-	-
11-13	3.0	.51	>15	-	-	-	-
13-15	2.9	1.3	5.3	-	-	-	0
15-17	1.9	.27	.6	-	-	-	-
17-19	2.1	.31	.6	-	-	-	-
19-21	2.2	.56	.6	-	-	-	0

TENTATIVE TERPENE PRODUCTS

TIME (PDT)	$C_9H_{14}O_2$ Isomers	$C_{10}H_{14}O_3$ Isomers	$C_{10}H_{16}O_2$ Isomers	$C_{10}H_{16}O_3$ Pinonic Acid?
7-21	.093	.020	-	-
7-9	.11	-	-	-
9-11	.057	-	-	-
11-13	.14	-	-	-
13-15	.044	-	.062	-
15-17	-	-	-	-
17-19	-	-	-	-
19-21	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Pomona, California

ALIPHATIC HYDROCARBONS

TIME (PDT)	C_5H_{11} Total Alkanes	C_6H_{13} Alkanes, Low Molec Wt	C_6H_{13} Alkanes, Med MW	C_6H_{13} Alkanes, High MW	C_5H_9 Total Alkenes	C_6H_{11} Alkenes, Low MW	C_6H_{11} Alkenes, Med MW	C_6H_{11} Alkenes, High MW
7-21	.18	.019	.070	.018	.41	0	.16	.11
7-9	.38	.03	.18	.048	1.04	.15	.26	.16
9-11	.22	.014	.066	.036	.83	.13	.20	.17
11-13	.26	.09	.12	.014	.62	.085	.16	.22
13-15	.37	.034	.18	.027	.69	0	.31	.17
15-17	.50	.06	.15	.033	.94	.10	.42	.11
17-19	.53	.19	.13	.027	1.04	.10	.28	.12
19-21	.83	0	-	.34	.94	.04	.012	.51

AROMATIC HYDROCARBONS

TIME (PDT)	C_7H_7 Xylenes, Alkyl Benzenes	C_8H_{10} Xylenes, Ethyl Benzenes	C_9H_{11} Alkyl Benzenes	C_9H_{12} Alkyl Benzenes	$C_{10}H_{14}$ Alkyl Benzenes	$C_{12}H_{10}$ Biphenyl	$C_{13}H_{12}$ Diphenylmethane & Isomers
7-21	.18	.049	.070	.015	.023	-	-
7-9	.58	.12	.298	.057	.068	.0092	-
9-11	.43	.044	.210	.038	.040	-	-
11-13	.40	.29	.058	.014	.024	-	-
13-15	.17	.066	.086	.034	-	-	-
15-17	.43	.065	.193	.10	-	-	-
17-19	.42	.22	.263	.069	-	-	.016
19-21	.32	.058	.175	.020	.032	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Pomona, California

POLYCYCLIC HYDROCARBONS

TIME (PDT)	C_8H_8 Tetrahydro-naphthalene	C_9H_{10} Indan	$C_{10}H_8$ Naphthalene	$C_{10}H_{18}$ Perhydro-naphthalene	$C_{11}H_{10}$ Methyl-naphthalenes	$C_{11}H_{13}$ Dimethyltetra-hydronaphthalene	$C_{14}H_{10}$ Anthracene & Phenanthrene	$C_{16}H_{10}$ Pyrene & Isomers
7-21	.010	.0057	.0014	-	-	.018	-	.0041
7-9	.22	.18	.052	.11	.017	.13	.0079	-
9-11	.13	.093	.0070	-	.0077	.019	-	.044
11-13	.10	.038	.051	-	-	.016	-	-
13-15	.049	.010	.017	-	-	.031	-	-
15-17	.30	.10	.076	.24	-	.076	-	-
17-19	.17	.053	.014	-	.022	.036	-	-
19-21	.24	.040	.013	.15	-	.033	-	-

OXYGENATED AROMATICS

TIME (PDT)	$C_6H_4O_2$ Benzoquinone?	C_6H_5O Phenol + NO_2,CHO,COOH?	C_6H_6O Phenol	$C_6H_6O_2$ Dihydroxy-benzenes	C_7H_6O Benzaldehyde + Interference	C_7H_8O Hydroxytoluene + Benzyl Alcohol	$C_9H_{12}O$ Trimethylphenol + Isomers	$C_{12}H_{10}O_2$ Biphenol	$C_{14}H_{21}O$ Dibutyl-methylphenol
7-21	-	-	.023	.045	-	.030	-	.0040	-
7-9	.022	.38	.04	.20	.061	.16	.079	-	-
9-11	-	.19	.04	.17	.017	.13	.19	.086	-
11-13	.028	.36	.07	.11	.012	.043	.029	-	-
13-15	-	.003	.005	.052	-	.032	.017	-	.019
15-17	-	-	.089	.16	.044	.070	-	-	-
17-19	-	.44	.11	.21	.25	.052	-	-	.021
19-21	-	.42	.10	.19	.15	.10	.10	.029	-

CONCENTRATIONS (μg/m³) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Pomona, California

CARBOXYLIC ACIDS

TIME (PDT)	$C_2H_4O_2$ Total Acids (as acetic)	$C_4H_6O_2$ Pentanedioic Acid	$C_5H_8O_2$ Hexanedioic Acid	$C_6H_{10}O_2$ Methylhexanedioic Acid	C_7H_5O Benzoyl Ion	$C_7H_6O_2$ Benzoic Acid	$C_8H_8O_2$ Methylbenzoic Isomers	$C_9H_{10}O_2$ Ethylbenzoic Isomers	$C_{10}H_{12}O_2$ Trimethylbenzoic Isomers
7-21	.32	1.4	1.1	.64	.09	0	-	.0084	-
7-9	.82	4.0	4.3	2.0	0	0	-	.062	-
9-11	.76	4.1	3.6	2.2	.81	.07	-	-	.042
11-13	.56	2.0	1.7	1.4	0	0	-	-	-
13-15	.56	1.4	2.0	.91	.07	0	-	-	-
15-17	2.9	3.0	2.3	.52	.61	.005	-	-	.096
17-19	1.2	5.9	4.7	.71	2.5	.4	-	.075	-
19-21	.49	.73	1.9	.52	2.1	.6	.053	.038	-

SECONDARY DIFUNCTIONALS

TIME (PDT)	$C_5H_8O_3$ Cyclohexene product?	$C_5H_{10}O_2$ Cyclohexene product?	$C_5H_{10}O_3$ Isomers	$C_6H_8O_2$ 1-heptene product?	$C_6H_{12}O_3$ Isomers	$C_7H_{10}O_2$ Isomers	$C_7H_{12}O_2$ Isomers	$C_7H_{12}O_3$ Isomers	$C_8H_5O_3$ Phthalates
7-21	-	-	-	.55	-	.34	-	.072	.46
7-9	.39	-	.59	3.3	.28	2.4	.48	-	1.3
9-11	-	-	-	1.8	.11	1.2	.21	.31	1.4
11-13	.14	-	.13	.90	-	.27	-	-	1.3
13-15	-	.076	-	-	.091	.54	.27	-	2.8
15-17	.18	-	-	.64	.13	.86	-	-	3.3
17-19	.76	-	.14	2.0	.31	-	-	-	3.1
19-21	.16	.094	.44	1.0	-	.14	.14	-	2.0

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 10, 1975, at Pomona, California

SECONDARY DIFUNCTIONALS WITH NITROGEN

TIME (PDT)	$C_5H_7NO_4$ $HCO(CH_2)_3COONO$	$C_5H_7NO_5$ $HOOC(CH_2)_3COONO$	$C_5H_7NO_6$ Isomers	$C_5H_9NO_4$ $HCO(CH_2)_4ONO_2$ + Isomers	$C_5H_9NO_5$ $HOOC(CH_2)_4ONO_2$	$C_6H_9NO_4$ $HCO(CH_2)_4COONO$	$C_6H_9NO_5$ $HOOC(CH_2)_4COONO$	$C_6H_9NO_6$ Isomers
7-21	.029	-	-	-	-	-	-	-
7-9	.093	-	.083	-	.12	-	.12	-
9-11	-	-	.10	-	.19	-	-	-
11-13	-	-	-	.18	-	-	-	-
13-15	-	-	.071	-	-	-	-	-
15-17	-	-	-	-	-	-	-	-
17-19	-	-	-	-	-	-	-	-
19-21	-	-	.16	-	-	-	-	-

SECONDARY DIFUNCTIONALS WITH NITROGEN (cont.)

TIME (PDT)	$C_6H_{11}NO_4$ $HCO(CH_2)_5ONO_2$ + Isomers	$C_6H_{11}NO_5$ $HOOC(CH_2)_5ONO_2$	$C_7H_{11}NO_5$ $HOOC(CH_2)_5COONO$	$C_7H_{13}NO_4$ $HCO(CH_2)_6ONO_2$ + Isomers	$C_7H_{13}NO_5$ $HOOC(CH_2)_6ONO_2$ + Isomers
7-21	.061	-	-	-	-
7-9	-	-	-	-	-
9-11	-	-	-	-	-
11-13	-	-	-	-	-
13-15	-	-	-	-	-
15-17	-	-	-	-	-
17-19	.12	-	-	-	-
19-21	-	-	-	-	-

CONCENTRATIONS (μg/m^3) OF AIR POLLUTANTS BY MSTA
Sampled July 10, 1975, at Pomona, California

NITROGEN COMPOUNDS

TIME (PDT)	CH_2CN fragment (relative)	CONH fragment (relative)	$C_3H_5N_2$ fragment (relative)	CH_2NO_3 fragment (relative)	$C_4H_8N_2$ fragment (relative)	$C_4H_9N_2$ fragment (relative)	C_5H_5N Pyridine & Pyridyls	$C_5H_{10}N$ Piperidines & Isomers
7-21	.20	2.0	-	-	-	.034	.0019	.0037
7-9	1.5	3.4	0	.32	0	-	.053	.14
9-11	.94	6.3	.03	-	.07	.11	.015	.057
11-13	.57	5.0	0	.10	-	-	.012	.013
13-15	.12	1.4	-	.030	-	-	-	-
15-17	1.9	8.1	.10	-	-	.14	-	-
17-19	1.3	5.4	1.9	.090	-	-	-	-
19-21	2.3	8.0	.7	-	-	-	-	-

NITROGEN COMPOUNDS (cont.)

TIME (PDT)	$C_7H_7NO_3$ Hydroxynitro-toluene	$C_7H_7NO_4$ Toluene oxidn. prod.	C_9H_7N Quinoline?	$C_{10}H_7NO_2$ Nitro-naphthalene	$C_{12}H_9N$ Carbazole	$C_{13}H_9N$ Acridine & Isomers
7-21	.0050	-	-	-	-	-
7-9	-	-	.034	-	.011	-
9-11	-	-	.037	-	.0089	.016
11-13	-	-	-	-	-	-
13-15	-	-	-	-	-	-
15-17	-	-	.019	-	-	-
17-19	-	-	-	-	-	-
19-21	-	.011	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 10, 1975, at Pomona, California

TIME (PDT)	INORGANICS Sulfates as Sulfuric Acid	Ammonium Chloride	Ammonium Nitrate	CHLORINATED COMPOUNDS $C_{12}H_5Cl_3$ PCB?	$C_7H_4Cl_3$ Isodrin	$C_6H_4Cl_3$ Lindane	C_5H_5Cl Heptachlor?
7-21	3.0	.40	>15	-	-	-	0
7-9	13.6	4.9	44	-	-	0	0
9-11	9.6	5.9	44	.084	.059	.4	0
11-13	6.5	4.5	34	-	.084	.12	0
13-15	2.3	.17	0.03	-	-	-	0
15-17	8.9	1.8	14	-	-	0	0
17-19	9.2	.37	-	-	-	-	-
19-21	2.7	-	-	-	-	.35	0

TENTATIVE TERPENE PRODUCTS

TIME (PDT)	$C_9H_{14}O_2$ Isomers	$C_{10}H_{14}O_3$ Isomers	$C_{10}H_{16}O_2$ Isomers	$C_{10}H_{16}O_3$ Pinonic Acid?	$C_8H_{12}O_4$ Norpinic Acid?	$C_9H_{14}O_4$ Pinic Acid?
7-21	-	.058	-	-	-	-
7-9	.13	-	-	.14	-	-
9-11	.10	.27	-	-	-	-
11-13	-	-	-	-	-	-
13-15	.076	-	-	-	-	-
15-17	.47	-	-	-	-	-
17-19	.084	-	-	-	.11	-
19-21	-	-	-	-	-	.12

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 10, 1975, at Riverside, California

ALIPHATIC HYDROCARBONS

TIME (PDT)	C_5H_{11} Total Alkanes	C_6H_{13} Alkanes, Low Molec Wt	C_6H_{13} Alkanes, Med MW	C_6H_{13} Alkanes, High MW	C_5H_9 Total Alkenes	C_6H_{11} Alkenes, Low MW	C_6H_{11} Alkenes, Med MW	C_6H_{11} Alkenes, High MW
7-21	.05	0	.019	.020	.18	-	.022	.088
7-9	.47	.09	.14	.065	.90	.079	.22	.12
9-11	.33	.035	.18	.09	.88	.047	.25	.29
11-13	.28	.08	.12	.033	.58	0	.12	.15
13-15	.12	.015	.078	.018	.62	.013	.19	.13
15-17	.09	-	.10	.06	.37	.001	.084	.16
17-19	.17	-	.086	.002	.36	-	.17	.09
19-21	.09	.040	.027	-	.29	.020	.09	.037

AROMATIC HYDROCARBONS

TIME (PDT)	C_7H_7 Xylenes, Alkyl Benzenes	C_8H_{10} Xylenes, Ethyl Benzenes	C_9H_{11} Alkyl Benzenes	C_9H_{12} Alkyl Benzenes	$C_{10}H_{14}$ Alkyl Benzenes	$C_{13}H_{12}$ Diphenylmethane & Isomers
7-21	.10	.009	.068	.022	.040	.0020
7-9	.38	.11	.035	.019	-	-
9-11	.37	.10	.144	.098	.035	-
11-13	.19	.011	.049	-	-	-
13-15	.19	.006	.033	.020	-	-
15-17	.17	-	.047	-	-	-
17-19	.20	.03	.030	.012	-	-
19-21	.10	.006	.019	.0076	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Riverside, California

POLYCYCLIC AROMATICS

TIME (PDT)	C_8H_8 Tetrahydro-naphthalene	C_9H_{10} Indan	$C_{10}H_9$ Naphthalene	$C_{10}H_{18}$ Perhydro-naphthalene	$C_{11}H_{10}$ Methyl-naphthalenes	$C_{11}H_{13}$ Dimethyltetra-hydronaphthalene	$C_{14}H_{10}$ Anthracene & Phenanthrene	$C_{16}H_{10}$ Pyrene & Isomers
7-21	.033	.0080	.0069	.0048	.0020	.0081	-	-
7-9	.19	.024	.016	-	-	-	-	-
9-11	.41	.021	.011	-	-	.020	-	-
11-13	.021	-	-	-	-	-	-	-
13-15	.057	-	.011	-	-	-	-	-
15-17	.086	-	-	-	-	-	-	-
17-19	.041	.016	.004	-	-	.014	-	-
19-21	.016	-	0	-	-	-	-	-

OXYGENATED AROMATICS

TIME (PDT)	$C_6H_4O_2$ Benzoquinone?	C_6H_5O Phenol + NO_2,CHO,COOH?	C_6H_6O Phenol	$C_6H_6O_2$ Dihydroxy-benzenes	C_7H_6O Benzaldehyde + Interference	C_7H_8O Hydroxytoluene + Benzyl Alcohol	$C_9H_{12}O$ Trimethylphenol + Isomers	$C_{12}H_{10}O_2$ Biphenol	$C_{14}H_{21}O$ Dibutyl-methylphenol
7-21	-	-	.010	.057	-	.021	.019	-	-
7-9	-	.31	.048	.12	.023	.061	.061	-	-
9-11	-	.46	.09	.091	.039	.068	.026	-	-
11-13	-	.07	0	-	-	-	-	-	-
13-15	-	-	.053	.090	-	.037	.043	-	-
15-17	-	-	0	.027	-	.051	.058	-	-
17-19	-	-	-	.041	0	.011	-	-	-
19-21	-	.019	0	.053	-	.029	.011	-	.012

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 10, 1975, at Riverside, California

CARBOXYLIC ACIDS

TIME (PDT)	$C_2H_4O_2$ Total Acids (as acetic)	$C_4H_6O_2$ Pentanedioic Acid	$C_5H_8O_2$ Hexanedioic Acid	$C_6H_{10}O_2$ Methylhexanedioic Acid	C_7H_5O Benzoyl Ion	$C_7H_6O_2$ Benzoic Acid	$C_8H_8O_2$ Methylbenzoic Isomers	$C_9H_{10}O_2$ Ethylbenzoic Isomers	$C_{10}H_{12}O_2$ Trimethylbenzoic Isomers
7-21	.31	.96	1.0	.47	.03	0	.012	.018	-
7-9	.77	1.2	5.1	.40	0	0	.043	.046	-
9-11	.96	4.7	3.0	1.2	0	0	-	.092	-
11-13	.66	.75	-	-	0	0	-	-	-
13-15	.62	2.9	2.7	.81	.22	-	.027	-	-
15-17	.72	2.4	.73	.15	.13	-	-	-	-
17-19	.38	1.3	.53	-	0	0	-	-	-
19-21	.27	.72	1.3	.67	.01	-	-	-	-

SECONDARY DIFUNCTIONALS

TIME (PDT)	$C_5H_8O_3$ Cyclohexene Product?	$C_5H_{10}O_2$ Cyclohexene Product?	$C_5H_{10}O_3$ Isomers	$C_6H_8O_2$ 1-heptene product?	$C_6H_{12}O_3$ Isomers	$C_7H_{10}O_2$ Isomers	$C_7H_{12}O_2$ Isomers	$C_7H_{12}O_3$ Isomers	$C_8H_5O_3$ Phthalates
7-21	-	-	.034	.41	-	.082	.023	.039	.34
7-9	-	-	-	1.5	-	1.4	.37	-	2.1
9-11	.13	.16	.24	1.5	-	.60	.52	.12	1.6
11-13	-	.17	-	-	-	-	-	-	1.3
13-15	-	-	-	1.3	-	.19	-	-	1.4
15-17	-	-	-	.79	-	.48	.087	-	1.2
17-19	-	-	-	.75	-	-	.10	-	.69
19-21	-	-	-	.46	-	.039	.071	-	1.2

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA
Sampled July 10, 1975, at Riverside, California

SECONDARY DIFUNCTIONALS WITH NITROGEN

TIME (PDT)	$C_5H_7NO_4$ $HCO(CH_2)_3COONO$	$C_5H_7NO_5$ $HOOC(CH_2)_3COONO$	$C_5H_7NO_6$ Isomers	$C_5H_9NO_4$ $HCO(CH_2)_4ONO_2$ + Isomers	$C_5H_9NO_5$ $HOOC(CH_2)_4ONO_2$	$C_6H_9NO_4$ $HCO(CH_2)_4COONO$	$C_6H_9NO_5$ $HOOC(CH_2)_4COONO$	$C_6H_9NO_6$ Isomers
7-21	-	-	-	-	-	-	-	-
7-9	-	-	-	-	.28	-	-	-
9-11	-	-	-	.21	.31	-	-	-
11-13	-	-	-	-	-	-	-	-
13-15	-	-	-	-	-	-	-	-
15-17	-	-	-	-	-	-	-	-
17-19	-	-	-	-	-	-	-	-
19-21	-	-	-	-	.023	-	-	-

SECONDARY DIFUNCTIONALS WITH NITROGEN (cont.)

TIME (PDT)	$C_6H_{11}NO_4$ $HCO(CH_2)_5ONO_2$ + Isomers	$C_6H_{11}NO_5$ $HOOC(CH_2)_5ONO_2$	$C_7H_{11}NO_5$ $HOOC(CH_2)_5COONO$	$C_7H_{13}NO_4$ $HCO(CH_2)_6ONO_2$ + Isomers	$C_7H_{13}NO_5$ $HOOC(CH_2)_6ONO_2$ + Isomers
7-21	.032	-	-	-	-
7-9	-	-	-	-	-
9-11	-	-	-	-	-
11-13	-	-	-	-	-
13-15	.16	-	-	-	-
15-17	-	-	-	-	-
17-19	-	-	-	-	-
19-21	-	-	-	-	-

CONCENTRATIONS ($\mu g/m^3$) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Riverside, California

NITROGEN COMPOUNDS

TIME (PDT)	CH_2CN fragment (relative)	CONH fragment (relative)	$C_3H_5N_2$ fragment (relative)	CH_2NO_3 fragment (relative)	$C_4H_8N_2$ fragment (relative)	$C_4H_9N_2$ fragment (relative)	C_5H_5N Pyridine & Pyridyls	$C_5H_{10}N$ Piperidines & Isomers
7-21	.26	1.5	0	-	0	.030	.00087	-
7-9	.19	5.1	-	.086	-	-	-	.041
9-11	.97	5.4	.01	-	-	-	-	.013
11-13	.17	4.1	-	-	-	-	-	-
13-15	.88	4.1	-	-	.03	-	-	.012
15-17	.20	2.1	.08	.067	.05	-	-	-
17-19	-	2.7	0	-	-	-	-	-
19-21	.088	1.3	.06	-	0	-	-	-

NITROGEN COMPOUNDS (cont.)

TIME (PDT)	$C_7H_7NO_3$ Hydroxynitro-toluene	$C_7H_7NO_4$ Toluene oxidn. prod.	C_9H_7N Quinoline?	$C_{10}H_7NO_2$ Nitro-naphthalene	$C_{12}H_9N$ Carbazole	$C_{13}H_9N$ Acridine & Isomers
7-21	-	-	.0073	-	.0018	-
7-9	-	-	.022	-	-	-
9-11	-	-	.037	-	.011	-
11-13	-	-	-	-	-	-
13-15	-	-	.011	-	-	-
15-17	-	-	.019	-	-	-
17-19	-	-	-	-	-	-
19-21	-	-	-	-	-	-

CONCENTRATIONS (μg/m^3) OF AIR POLLUTANTS BY MSTA

Sampled July 10, 1975, at Riverside, California

	INORGANICS			CHLORINATED COMPOUNDS			
TIME (PDT)	Sulfates as Sulfuric Acid	Ammonium Chloride	Ammonium Nitrate	$C_{12}H_5Cl_3$ PCB?	$C_7H_4Cl_3$ Isodrin	$C_6H_4Cl_3$ Lindane	C_5H_5Cl Heptachlor?
7-21	3.5	0.08	4.3	.0097	-	-	0
7-9	8.1	3.4	>50	-	-	0	0
9-11	4.9	4.5	>40	-	-	0	0
11-13	3.6	2.2	5.7	-	-	.14	.17
13-15	4.1	2.9	5.4	-	-	0	.34
15-17	2.8	.25	.45	-	.11	0	0
17-19	2.3	.18	.43	-	-	0	0
19-21	1.8	-	0	-	-	0	-

TENTATIVE TERPENE PRODUCTS

TIME (PDT)	$C_9H_{14}O_2$ Isomers	$C_{10}H_{14}O_3$ Isomers	$C_{10}H_{16}O_2$ Isomers	$C_{10}H_{16}O_3$ Pinonic Acid?
7-21	-	-	-	-
7-9	-	-	-	-
9-11	-	.21	-	-
11-13	-	-	-	-
13-15	-	-	-	-
15-17	-	-	-	-
17-19	-	-	-	-
19-21	-	-	-	

Appendix F

The Reactivity of Aerosol Components with Solvent Constituents

The extraction of aerosol constituents in refluxing polar methanol-chloroform for six hours provides ample opportunity for chemical reactions. For example, acids may form methyl esters with methanol, nitrates may hydrolyze to alcohols with the water likely to be present in the solvent or with water liberated by esterification reactions. If such reactions occur a number of errors may be introduced:

1. The number of carbons for individual compounds may increase.
2. Non-volatile compounds (e.g., dicarboxylic acids) may form relatively volatile products (e.g., di-esters) and be lost during the solvent removal procedure.
3. Determination of specific, reactive compounds by techniques such as MSTA would not be possible following extraction by the reactive solvent.

To evaluate the extent of such errors an experiment was performed with realistic concentrations of known carboxylic acids under simulated extraction conditions. Two acids were used, hexanedioic (adipic) and abietic acid, a mono-carboxylic acid ($C_{20}H_{30}O_2$) found in rosin. 0.4 mg of each compound was refluxed for six hours in ca. 60 ml 2:1 v/v chloroform-methanol. In an additional experiment, 0.4 mg of hexanedioic acid was added to a concentrated chloroform-methanol extract of a 14-hour atmospheric filter sample, the solution diluted to about 60 ml with the solvent and refluxed six hours. The solutions were reduced in volume to 10 ml and, except for the spiked extract, aliquots evaporated to dryness for carbon analysis as detailed in Appendix C. The latter includes vacuum treatment for 30 minutes at room temperature.

The carbon analysis results for hexanedioic acid indicated 38% recovery (mean of three determinations) relative to the initial carbon due to the acid. In contrast the results with abietic acid indicated a mean recovery of 103%.

In an effort to follow any chemical changes occurring, infra-red spectra were determined with a Perkin-Elmer 621 grating spectrometer for fresh and refluxed reactants. Because of the low concentrations involved and because of spectral interference from the solvent, spectra were only obtainable by evaporating ca. 50% of the total extracts onto salts plates. The resulting spectra exhibited weak carbonyl bands which were notably shifted from that expected for carboxylic acids. The IR results are summarized in Table F-1. Hexanedioic acid gave evidence of ester formation with the corresponding carbonyl band substantially more intense than that ascribed to the acid. With abietic acid, ester formation as evidenced by carbonyl changes, occurred to a much lesser degree. The small differences between observed and expected carbonyl positions are ascribed to the absence of solvent in the present spectra.

The loss of hexanedioic acid during carbon determination can be ascribed to volatization of the di-ester (molecular weight 174.2) which is a liquid at room temperature, boiling point 115°C (at 13 mm Hg). The apparent high recovery of abietic acid during carbon determination may be ascribed to its lesser degree of ester formation and to the relatively low volatility of its methyl ester (molecular weight 332, boiling point 225°C at 16 mm Hg).

The significance of these findings to MSTA results is apparent; it is expected that carboxylic acids and other reactive organics (e.g. acid nitrates) not previously extracted in benzene would be largely reacted in the mixed solvent and, therefore, undetectable by MSTA. The significance of these findings for carbon determinations is more subtle since it depends on the volatility of any reaction products. Control experiments described in Table D-4 of Appendix D indicate for an MCC sample loss of only 4% carbon during the 30-minute vacuum treatment. Since, prior to the vacuum treatment, solvent was removed at about room temperature into a moving stream of particle-free air we assume (but cannot prove) that the 4% loss of carbon reflects the loss of particulate organics for the entire solvent removal process.

If it is accepted that the organics recovered from the methanol-chloroform extract are relatively non-volatile than a positive error should be introduced in the carbon determinations due to the addition of carbon from the solvent in forming products such as esters and ethers. The significance of this error depends on the average number of carbons in the particulate organics and the fraction of the carbon atoms bearing reactive groups available for ester or ether formation. If the average number of carbons in the MCC fraction is assumed to be six and 10% of all carbons assumed able to react with addition of CH_3O-from methanol, then a 10% positive error in carbon determination would be introduced.

While techniques such as nuclear magnetic resonence could be useful in directly monitoring such solvent-particulate reactions by measuring changes in CH_3 or CH_3O content, this was not currently feasible.

Table F-1

INFRA-RED SPECTRAL RESULTS FROM REACTION OF CARBOXYLIC ACIDS WITH CHLOROFORM-METHANOL[a]

Sample	Carbonyl Peak Positions, (cm^{-1})	Expected Carbonyl Positions, (cm^{-1})[b]
Hexanedioic acid, unreacted	1680	1700
Hexanedioic acid, refluxed in chloroform-methanol	1720 (weak) 1690 (shoulder)	--- ---
Methylester of hexanedioic acid	---	1739
Abietic acid, unreacted	1700-1710 (weak, broad)	1705-1725
Abietic acid, refluxed in chloroform-methanol	1735 (weak) 1700 (weak)	--- ---
Methylester of abietic acid	---	1735-1750
Hexanedioic acid, refluxed in chloroform-methanol with atmospheric extract	1710-1725 (weak, broad) 1690 (shoulder)	--- ---
Hexanedioic acid, unreacted in chloroform-methanol with atmospheric extract	1680 (shoulder)	1700

a. All spectra obtained on samples evaporated onto a NaCl plate from methanol-chloroform solution.

b. L. J. Bellamy, "The Infra-Red Spectra of Complex Molecules," Wiley and Sons, New York (1958).

Appendix G

The solvent extraction-carbon analysis data were compiled and keypunched according to the format given in Table G-1. The data are included as Table G-2.

Table G-1

FORMAT FOR SOLVENT EXTRACTION-CARBON ANALYSIS DATA

Column	Use
1- 8	Filter code: wx yyyy zz where w = station code, C = Pasadena P = Pomona R = Riverside x = Episode designation by day, A,B,C... yyyy = Filter number zz = Filter type, HR indicates glass fiber filter
10-15	Date sampled
17-25	Time of Day (PDT)
28	Analytical lab. A indicates AIHL
29-34	Date analyzed
35-37	Species analyzed: CEL = total carbon MCC = methanol-chloroform extractable carbon BEC = benzene extractable carbon CEC = cyclohexane extractable carbon
39-43	Flow rate, m^3/cm^2
45-53	Concentration, $\mu g/m^3$
55-63	Analytical error, $\mu g/m^3$
68-69	Filter section number. L and R indicate left and right filter halves (arbitrary designation).
74-76	Hi-vol sampler number.

Table G-2

Solvent Extraction-Carbon Analysis Data

OBSERVED 14-HOURS ORGANIC SAMPLES

CB0350HR	070975	0700-2100	A050676BEC	2.770	.9446E+01	.3977E+00	01	006
CB0350HR	070975	0700-2100	A050576CEC	2.770	.6296E+01	.2998E+00	01	006
CB0350HR	070975	0700-2100	A032276CEL	2.770	.3592E+02	.6733E+00	L6	006
CB0350HR	070975	0700-2100	A051076MCC	2.770	.1146E+02	.1184E+01	01	006
PB0421HR	070975	0700-2100	A050476BEC	2.700	.9986E+01	.6205E+00	01	005
PB0421HR	070975	0700-2100	A050576CEC	2.700	.6537E+01	.3113E+00	01	005
PB0421HR	070975	0700-2100	A032376CEL	2.700	.3531E+02	.6570E+00	L6	005
PB0421HR	070975	0700-2100	A051076MCC	2.700	.9113E+01	.9413E+00	01	005
RB0472HR	070975	0659-2103	A050676BEC	3.230	.7092E+01	.2986E+00	01	003
RB0472HR	070975	0659-2103	A050576CEC	3.230	.4409E+01	.2105E+00	01	003
RB0472HR	070975	0659-2103	A032576CEL	3.230	.2379E+02	.5441E+00	L6	003
RB0472HR	070975	0659-2103	A051076MCC	3.230	.9754E+01	.1007E+01	01	003
CC0360HR	071075	0700-2100	A042176BEC	2.784	.7806E+01	.3286E+00	01	006
CC0360HR	071075	0700-2100	A041476CEC	2.784	.4147E+01	.1987E+00	01	006
CC0360HR	071075	0700-2100	A041276CEL	2.784	.3036E+02	.5744E+00	L6	006
CC0360HR	071075	0700-2100	A042176MCC	2.784	.9740E+01	.1006E+01	01	006
PC0430HR	071075	0700-2100	A042176BEC	2.700	.7530E+01	.3171E+00	01	005
PC0430HR	071075	0700-2100	A041476CEC	2.700	.5569E+01	.2657E+00	01	005
PC0430HR	071075	0700-2100	A041576CEL	2.700	.3311E+02	.6260E+00	L6	005
PC0430HR	071075	0700-2100	A042176MCC	2.700	.8523E+01	.8804E+00	01	005
RC0481HR	071075	0700-2100	A042176BEC	3.310	.3936E+01	.1657E+00	01	003
RC0481HR	071075	0700-2100	A041476CEC	3.310	.2943E+01	.1417E+00	01	003
RC0481HR	071075	0700-2100	A041676CEL	3.310	.2066E+02	.3918E+00	L6	003
RC0481HR	071075	0700-2100	A042176MCC	3.310	.7092E+01	.7326E+00	01	003
CD0301HR	071175	0700-2100	A050576BEC	2.784	.7222E+01	.3056E+00	01	006
CD0301HR	071175	0700-2100	A050576CEC	2.784	.4827E+01	.2306E+00	01	006
CD0301HR	071175	0700-2100	A070776CEL	2.784	.2427E+02	.4608E+00	L6	006
CD0301HR	071175	0700-2100	A051076MCC	2.784	.9136E+01	.9436E+00	01	006
PD0438HR	071175	0700-2101	A050576BEC	2.734	.6279E+01	.2652E+00	01	005
PD0438HR	071175	0700-2101	A050576CEC	2.734	.5472E+01	.2611E+00	01	005
PD0438HR	071175	0700-2101	A052776CEL	2.734	.2627E+02	.4982E+00	L6	005
PD0438HR	071175	0700-2101	A051076MCC	2.734	.9028E+01	.9327E+00	01	005
RD0489HR	071175	0701-2101	A050576BEC	3.210	.4679E+01	.1970E+00	01	003
RD0489HR	071175	0701-2101	A050576CEC	3.210	.3057E+01	.1471E+00	01	003
RD0489HR	071175	0701-2101	A050376CEL	3.210	.1992E+02	.3786E+00	L6	003
RD0489HR	071175	0701-2101	A051076MCC	3.210	.6793E+01	.7018E+00	01	003
CE0312HR	071275	0700-2100	A042176BEC	2.851	.3232E+01	.1361E+00	01	006
CE0312HR	071275	0700-2100	A041476CEC	2.851	.2800E+01	.1357E+00	01	006
CE0312HR	071275	0700-2100	A031876CEL	2.851	.1370E+02	.2651E+00	L6	006
CE0312HR	071275	0700-2100	A042176MCC	2.851	.4413E+01	.4559E+00	01	006
PE0376HR	071275	0700-2100	A042176BEC	2.669	.4453E+01	.1875E+00	01	005
PE0376HR	071275	0700-2100	A041476CEC	2.669	.3292E+01	.1390E+00	01	005
PE0376HR	071275	0700-2100	A021976CEL	2.669	.1991E+02	.3303E+00	L6	005
PE0376HR	071275	0700-2100	A042176MCC	2.669	.5511E+01	.5700E+00	01	005
RE0442HR	071275	0700-2100	A042176BEC	3.280	.3882E+01	.1635E+00	01	003
RE0442HR	071275	0700-2100	A041476CEC	3.280	.2297E+01	.1117E+00	01	003
RE0442HR	071275	0700-2100	A030376CEL	3.280	.1625E+02	.3102E+00	L6	003
RE0442HR	071275	0700-2100	A042176MCC	3.280	.4691E+01	.4852E+00	01	003

OBSERVED 2-HOURS ORGANIC SAMPLES

---EPISODE B---

CB0351HR	070975	0700-0900	A062776BFC	0.415	.2840E+01	.3390E+00	01	001
CB0352HR	070975	0902-1100	A063076BFC	0.408	.4609E+01	.5456E+00	01	001
CB0353HR	070975	1102-1300	A070176BFC	0.403	.6853E+01	.8106E+00	01	001
CB0354HR	070975	1302-1500	A070876BFC	0.403	.7018E+01	.8301E+00	01	001
CB0356HR	070975	1502-1700	A071276BFC	0.403	.6101E+01	.7299E+00	01	001
CB0358HR	070975	1702-1900	A071576BFC	0.408	.3520E+01	.4171E+00	01	001
CB0359HR	070975	1902-2100	A071576BFC	0.403	.3223E+01	.3822E+00	01	001
CB0351HR	070975	0700-0900	A060476CFC	0.415	.3601E+01	.5903E+00	01	001
CB0352HR	070975	0902-1100	A061176CFC	0.408	.4198E+01	.6791E+00	01	001
CB0353HR	070975	1102-1300	A062276CFC	0.403	.6636E+01	.1046E+01	01	001
CB0354HR	070975	1302-1500	A062376CFC	0.403	.8049E+01	.1261E+01	01	001
CB0355HR	070975	1502-1700	A062976CFC	0.403	.4615E+01	.7410E+00	01	001
CB0358HR	070975	1702-1900	A071276CFC	0.408	.2547E+01	.4413E+00	01	001
CB0359HR	070975	1902-2100	A071976CFC	0.403	.2611E+01	.4511E+00	01	001
CB0351HR	070975	0700-0900	A032276CFL	0.415	.2624E+02	.8148E+00	L6	001
CB0352HR	070975	0902-1100	A032276CFL	0.408	.4315E+02	.1220E+01	L6	001
CB0353HR	070975	1102-1300	A032276CFL	0.403	.5379E+02	.1497E+01	L6	001
CB0354HR	070975	1302-1500	A032376CFL	0.403	.5837E+02	.1503E+01	L6	001
CB0356HR	070975	1502-1700	A032376CFL	0.403	.4197E+02	.1193E+01	L6	001
CB0358HR	070975	1702-1900	A032376CFL	0.408	.3015E+02	.9076E+00	L6	001
CB0359HR	070975	1902-2100	A032376CFL	0.403	.2649E+02	.8269E+00	L6	001
CB0351HR	070975	0700-0900	A062976MCC	0.415	.1263E+02	.4895E+00	01	001
CB0352HR	070975	0902-1100	A070276MCC	0.403	.1819E+02	.6570E+00	01	001
CB0353HR	070975	1102-1300	A070676MCC	0.403	.2309E+02	.8199E+00	01	001
CB0354HR	070975	1302-1500	A071376MCC	0.403	.2811E+02	.9769E+00	01	001
CB0356HR	070975	1502-1700	A071376MCC	0.403	.2036E+02	.7249E+00	01	001
CB0358HR	070975	1702-1900	A071676MCC	0.408	.1388E+02	.5277E+00	01	001
CB0359HR	070975	1902-2100	A071976MCC	0.403	.1250E+02	.4807E+00	01	001
PB0422HR	070975	0700-0900	A062576BFC	0.372	.4737E+01	.5608E+00	01	002
PB0423HR	070975	0901-1100	A063076BFC	0.364	.6609E+01	.7818E+00	01	002
PB0424HR	070975	1100-1300	A070176BEC	0.363	.6441E+01	.7520E+00	01	002
PB0426HR	070975	1302-1500	A070976BFC	0.357	.5407E+01	.6400E+00	01	002
PB0427HR	070975	1501-1659	A071276BFC	0.357	.8312E+01	.9831E+00	01	002
PB0428HR	070975	1700-1900	A071576BEC	0.363	.5843E+01	.6914E+00	01	002
PB0429HR	070975	1902-2100	A071576BEC	0.366	.4831E+01	.5719E+00	01	002
PB0422HR	070975	0700-0900	A060776CEC	0.372	.4711E+01	.7607E+00	01	002
PB0423HR	070975	0901-1100	A061176CEC	0.364	.5068E+01	.8150E+00	01	002
PB0424HR	070975	1100-1300	A062276CEC	0.363	.6219E+01	.9874E+00	01	002
PB0426HR	070975	1302-1500	A062376CEC	0.357	.4192E+01	.6871E+00	01	002
PB0427HR	070975	1501-1559	A062976CEC	0.357	.5386E+01	.8636E+00	01	002
PB0428HR	070975	1700-1900	A071276CEC	0.363	.5233E+01	.8398E+00	01	002
PB0429HR	070975	1902-2100	A071976CEC	0.366	.3640E+01	.6051E+00	01	002
PB0422HR	070975	0700-0900	A032376CEL	0.372	.3826E+02	.1118E+01	L6	002

R30423HR	070975	0901-1100	A032476CEL	0.354	.4330E+02	.1244E+01	L6	002
R30424HR	070975	1100-1300	A032476CEL	0.363	.4575E+02	.1304E+01	L6	002
R30426HR	070975	1302-1500	A032575CEL	0.357	.4266E+02	.1232E+01	L6	002
R30427HR	070975	1501-1659	A032576CEL	0.357	.4666E+02	.1329E+01	L6	002
R30428HR	070975	1700-1900	A032576CEL	0.363	.4595E+02	.1306E+01	L6	002
R30429HR	070975	1902-2100	A032576CEL	0.366	.3542E+02	.1054E+01	36	002
R30422HR	070975	0700-0900	A062976MCC	0.372	.1725E+02	.6387E+00	01	002
R30423HR	070975	0901-1100	A070276MCC	0.354	.6938E+01	.3574E+00	01	002
R30424HR	070975	1100-1300	A070676MCC	0.363	.2151E+02	.7716E+00	01	002
R30426HR	070975	1302-1500	A071376MCC	0.387	.1958E+02	.7142E+00	01	002
R30427HR	070975	1501-1659	A071376MCC	0.357	.2312E+02	.8231E+00	01	002
R30428HR	070975	1700-1900	A071676MCC	0.363	.2109E+02	.7364E+00	01	002
R30429HR	070975	1902-2100	A071976MCC	0.366	.1605E+02	.6053E+00	01	002
R30473HR	070975	0659-0900	A062576BEC	0.485	.3343E+01	.3959E+00	01	004
R30474HR	070975	0902-1100	A063076BEC	0.473	.5015E+01	.5933E+00	01	004
R30475HR	070975	1102-1300	A070176BEC	0.452	.4348E+01	.5146E+00	01	004
R30477HR	070975	1304-1500	A070376BEC	0.460	.2647E+01	.3139E+00	01	004
R30478HR	070975	1503-1700	A071276BEC	0.447	.2985E+01	.3539E+00	01	004
R30479HR	070975	1702-1900	A071576BEC	0.462	.3232E+01	.3829E+00	01	004
R30480HR	070975	1905-2101	A071575BEC	0.443	.4480E+01	.5303E+00	01	004
R30473HR	070975	0659-0900	A060776CEC	0.485	.2794E+01	.4633E+00	01	004
R30474HR	070975	0902-1100	A061176CEC	0.473	.3512E+01	.5696E+00	01	004
R30475HR	070975	1102-1300	A062276CEC	0.452	.3635E+01	.5891E+00	01	004
R30477HR	070975	1304-1500	A062376CEC	0.460	.2312E+01	.3986E+00	01	004
R30478HR	070975	1503-1700	A062376CEC	0.447	.1645E+01	.3126E+00	01	004
R30479HR	070975	1702-1900	A071276CEC	0.462	.2631E+01	.4432E+00	01	004
R30480HR	070975	1905-2101	A071976CEC	0.443	.2955E+01	.4724E+00	01	004
R30473HR	070975	0659-0900	A032576CEL	0.485	.3202E+02	.9215E+00	L6	004
R30474HR	070975	0902-1100	A032576CEL	0.473	.3570E+02	.1017E+01	L6	004
R30475HR	070975	1102-1300	A032676CEL	0.462	.4158E+02	.1163E+01	L6	004
R30477HR	070975	1304-1500	A032576CEL	0.460	.3580E+02	.1022E+01	L6	004
R30478HR	070975	1503-1700	A032576CEL	0.447	.2761E+02	.8367E+00	L6	004
R30479HR	070975	1702-1900	A032576CEL	0.462	.3145E+02	.9153E+00	L6	004
R30480HR	070975	1905-2101	A032575CEL	0.443	.3378E+02	.9702E+00	L6	004
[illegible]3HR	070975	0659-0900	A062276MCC	0.485	.1156E+02	.4406E+00	01	004
[illegible]74HR	070975	0902-1100	A070276MCC	0.473	.1708E+02	.6099E+00	01	004
R30475HR	070975	1102-1300	A070676MCC	0.462	.1876E+02	.6640E+00	01	004
R30477HR	070975	1304-1500	A071376MCC	0.460	.1543E+02	.5629E+00	01	004
R30478HR	070975	1503-1700	A071376MCC	0.447	.1209E+02	.4649E+00	01	004
R30479HR	070975	1702-1900	A071676MCC	0.462	.1334E+02	.4970E+00	01	004
R30480HR	070975	1905-2101	A071976MCC	0.443	.1582E+02	.5760E+00	01	004

OBSERVED 2-HOURS ORGANIC SAMPLES

EPISODE C

CC0362HR	071075	0700-0900	AC5187ABFC	0.419	.4221E+01	.4997E+00	01	001
CC0363HR	071075	0902-1100	AC5197ABFC	0.402	.3391E+01	.4020E+00	01	001
CC0364HR	071075	1102-1300	AC5217ABFC	0.408	.6839E+01	.9148E+00	01	001
CC0365HR	071075	1303-1500	AC6017ABFC	0.400	.7305E+01	.6330E+00	01	001
CC0366HR	071075	1502-1700	AC6047ABFC	0.403	.4902E+01	.5320E+00	01	001
CC0367HR	071075	1702-1900	AC5107ABFC	0.408	.2934E+01	.3450E+00	01	001
CC0368HR	071075	1902-2100	AC6237ABFC	0.403	.2753E+01	.3268E+00	01	001
CC0362HR	071075	0700-0900	AC5107ACFC	0.415	.3314E+01	.3486E+00	01	001
CC0363HR	071075	0902-1100	AC5127ACFC	0.403	.1943E+01	.3921E+00	01	001
CC0364HR	071075	1102-1300	AC5147ACFC	0.408	.7041E+01	.1107E+01	01	001
CC0365HR	071075	1303-1500	AC5197ACFC	0.400	.5792E+01	.9171E+00	01	001
CC0366HR	071075	1502-1700	AC5217ACFC	0.403	.4035E+01	.7031E+00	01	001
CC0367HR	071075	1702-1900	AC6037ACFC	0.408	.3919E+01	.3380E+00	01	001
CC0368HR	071075	1902-2100	AC6047ACFC	0.403	.3169E+01	.2299E+00	01	001
CC0362HR	071075	0700-0900	AC4127ACFL	0.415	.3205E+02	.7486E+00	LF	001
CC0363HR	071075	0902-1100	AC4137ACFL	0.403	.3502E+02	.1220E+01	LF	001
CC0364HR	071075	1102-1300	AC4147ACFL	0.408	.4627E+02	.1297E+01	LF	001
CC0365HR	071075	1303-1500	AC4157ACFL	0.400	.4767E+02	.1340E+01	LF	001
CC0366HR	071075	1502-1700	AC4157ACFL	0.403	.2836E+02	.9092E+00	LF	001
CC0367HR	071075	1702-1900	AC4157ACFL	0.408	.2851E+02	.8024E+00	LF	001
CC0368HR	071075	1902-2100	AC4157ACFL	0.403	.2257E+02	.7416E+00	LF	001
CC0362HR	071075	0700-0900	AC5107AMCC	0.415	.1462E+02	.5476E+00	01	001
CC0363HR	071075	0902-1100	AC6047AMCC	0.403	.1762E+02	.6410E+00	01	001
CC0364HR	071075	1102-1300	AC5247AMCC	0.408	.2547E+02	.8220E+00	01	001
CC0365HR	071075	1303-1500	AC6027AMCC	0.400	.1948E+02	.6960E+00	01	001
CC0366HR	071075	1502-1700	AC6037AMCC	0.403	.1220E+02	.4814E+00	01	001
CC0367HR	071075	1702-1900	AC6147AMCC	0.408	.1105E+02	.4476E+00	01	001
CC0368HR	071075	1902-2100	AC6257AMCC	0.403	.1026E+02	.4292E+00	01	001
PC0431HR	071075	0700-0900	AC5187ABFC	0.358	.9065E+01	.1072E+01	01	002
PC0432HR	071075	0901-1100	AC5217ABFC	0.350	.7966E+01	.6320E+00	01	002
PC0433HR	071075	1101-1301	AC5217ABFC	0.359	.4220E+01	.7398E+00	01	002
PC0434HR	071075	1302-1500	AC6007ABFC	0.352	.3003E+01	.6826E+00	01	002
PC0435HR	071075	1501-1700	AC6027ABFC	0.350	.3577E+01	.4242E+00	01	002
PC0436HR	071075	1702-1901	AC6117ABFC	0.350	.2611E+01	.3105E+00	01	002
PC0437HR	071075	1902-2100	AC6237ABFC	0.357	.2510E+01	.2986E+00	01	002
PC0431HR	071075	0700-0900	AC5107ACFC	0.358	.9663E+01	.1512E+01	01	002
PC0432HR	071075	0901-1100	AC5127ACFC	0.350	.5419E+01	.9657E+00	01	002
PC0433HR	071075	1101-1301	AC5147ACFC	0.359	.4291E+01	.7983E+00	01	002
PC0434HR	071075	1302-1500	AC5187ACFC	0.352	.2979E+01	.1151E+00	01	002
PC0435HR	071075	1501-1700	AC5217ACFC	0.350	.2937E+01	.5090E+00	01	002
PC0436HR	071075	1702-1901	AC6037ACFC	0.350	.2322E+01	.4273E+00	01	002
PC0437HR	071075	1902-2100	AC6047ACFC	0.357	.2511E+01	.4533E+00	01	002
PC0431HR	071075	0700-0900	AC4157ACFL	0.358	.6369E+02	.1750E+01	LF	002

PC0432HR	071075	0901-1100	A041376CFL	0.350	.54415+02	.15245+01	L6	002
PC0433HR	071075	1101-1301	A041576CFL	0.352	.43075+02	.13635+01	L6	002
PC0434HR	071075	1302-1500	A041776CFL	0.352	.27205+02	.87591+00	L6	002
PC0435HR	071075	1501-1700	A041676CFL	0.350	.15505+02	.72305+00	L6	002
PC0436HR	071075	1702-1901	A041676CFL	[illegible]	.15395+02	.70315+00	L6	002
PC0437HR	071075	1902-2100	A041676CFL	[illegible]	.23515+02	.79535+00	L6	002
PC0431HR	071075	0700-0900	A051976MCC	[illegible]	.24925+02	.67545+00	01	002
PC0432HR	071075	0901-1100	A052476MCC	[illegible]	.23725+02	.94405+00	01	002
PC0433HR	071075	1101-1301	A052476MCC	0.353	.23535+02	[illegible]	01	002
PC0434HR	071075	1302-1500	A060276MCC	0.352	.10735+02	[illegible]	01	002
PC0435HR	071075	1501-1700	A060376MCC	0.350	.95735+01	.41215+00	01	002
PC0436HR	071075	1702-1901	A061476MCC	0.350	[illegible]	.39505+00	01	002
PC0437HR	071075	1902-2100	A062576MCC	0.357	.83745+01	.40435+00	01	002
PC0482HR	071075	0700-0900	A051976MFC	0.458	.20805+01	[illegible]	01	004
[illegible]	071075	0900-1100	A052176MFC	0.446	.43005+01	.31005+00	01	004
[illegible]	071075	1100-1300	A052176MFC	0.440	.19015+01	.22545+00	01	004
[illegible]	071075	1300-1500	A060276MFC	0.458	.34235+01	.40555+00	01	004
RC0486HR	071075	1500-1700	A060276MFC	0.470	.27875+01	.33045+00	01	004
PC0487HR	071075	1700-1900	A061176MFC	0.476	.17005+01	.20205+00	01	004
RC0488HR	071075	1903-2101	A062376MFC	0.450	.10255+01	.17435+00	01	004
PC0482HR	071075	0700-0900	A051076CFC	0.458	.34135+01	[illegible]	01	004
PC0483HR	071075	0900-1100	A051276CFC	0.446	.33375+01	.54715+00	01	004
PC0484HR	071075	1100-1300	A051676CFC	0.440	.20435+01	.30575+00	01	004
PC0485HR	071075	1300-1500	A051976CFC	0.458	.12535+01	.25245+00	01	004
RC0486HR	071075	1500-1700	A052476CFC	0.470	.13315+01	.26855+00	01	004
RC0487HR	071075	1700-1900	A060376CFC	0.476	.95645+00	.22505+00	01	004
PC0488HR	071075	1903-2101	A060476CFC	[illegible]	.10205+01	.23405+00	01	004
RC0482HR	071075	0700-0900	A041676CFL	0.458	.34655+02	.92185+00	L6	004
PC0483HR	071075	0900-1100	A042076CFL	0.446	.36851+02	.10730+01	L6	004
RC0484HR	071075	1100-1300	A042176CFL	0.440	.25515+02	.79565+00	L6	004
RC0485HR	071075	1300-1500	A042276CFL	0.458	.25285+02	.84105+00	L6	004
RC0486HR	071075	1500-1700	A042376CFL	0.470	.20485+02	.66045+00	L6	004
RC0487HR	071075	1700-1900	A042376CFL	0.476	[illegible]	.63755+00	L6	004
PC0488HR	071075	1903-2101	A042376CFL	0.450	.17145+02	.60105+00	L6	004
RC0482HR	071075	0700-0900	A051976MCC	0.458	.16495+02	.53815+00	01	004
PC0483HR	071075	0900-1100	A052476MCC	0.446	.17715+02	.63325+00	01	004
RC0484HR	071075	1100-1300	A052576MCC	0.440	.13015+02	[illegible]	01	004
RC0485HR	071075	1300-1500	A060276MCC	0.458	.11655+02	.44055+00	01	004
RC0486HR	071075	1500-1700	A060376MCC	0.470	.75745+01	.33565+00	01	004
RC0487HR	071075	1700-1900	A061576MCC	0.476	.77435+01	.33205+00	01	004
RC0488HR	071075	1903-2101	A062576MCC	0.450	.80045+01	.40245+00	01	004

PD0440HR	071175	0902-1101	A062476CEL	0.355	.4151E+02	.1205E+01	L6	002
PD0371HR	071175	1103-1300	A062476CEL	0.349	.5374E+02	.1509E+01	L6	002
PD0372HR	071175	1301-1501	A063075CEL	0.353	.3446E+02	.1041E+01	L6	002
PD0373HR	071175	1502-1700	A070276CEL	0.352	.2845E+02	.9056E+00	L6	002
PD0374HR	071175	1701-1900	A070276CEL	0.364	.2323E+02	.8928E+00	L6	002
PD0375HR	071175	1901-2101	A070576CEL	0.372	.2674E+02	.9532E+00	L6	002
PD0439HR	071175	0700-0900	A062276MCC	0.363	.2162E+02	.7749E+00	01	002
PD0440HR	071175	0902-1101	A070276MCC	0.355	.1915E+02	.6717E+00	01	002
PD0371HR	071175	1103-1300	A070576MCC	0.349	.2330E+02	.8466E+00	01	002
PD0372HR	071175	1301-1501	A071076MCC	0.353	.1523E+02	.5570E+00	01	002
PD0373HR	071175	1502-1700	A071376MCC	0.352	.1268E+02	.5155E+00	01	002
PD0374HR	071175	1701-1900	A071676MCC	0.364	.9894E+01	.4311E+00	01	002
PD0375HR	071175	1901-2101	A071976MCC	0.372	.8575E+01	.3293E+00	01	002
PD0491HR	071175	0701-0902	A062576ESC	0.462	.2530E+01	.3071E+00	01	004
PD0493HR	071175	0902-1102	A063076ESC	0.460	.2513E+01	.3453E+00	01	004
PD0492HR	071175	1104-1305	A070176ESC	0.460	.2215E+01	.2631E+00	01	004
PD0494HR	071175	1305-1500	A070876ESC	0.435	.2070E+01	.2462E+00	01	004
PD0495HR	071175	1504-1700	A071276ESC	0.437	.3360E+01	.3992E+00	01	004
PD0496HR	071175	1701-1900	A071576ESC	0.448	.2778E+01	.3247E+00	01	004
PD0497HR	071175	1902-2104	A071976ESC	0.456	.3219E+01	.3514E+00	01	004
PD0491HR	071175	0701-0902	A060776CEC	0.462	.1930E+01	.3499E+00	01	004
PD0493HR	071175	0900-1102	A061176CEC	0.460	.2374E+01	.4101E+00	01	004
PD0492HR	071175	1104-1306	A062376CEC	0.460	.1237E+01	.2309E+00	01	004
PD0494HR	071175	1306-1500	A062576CEC	0.435	.1531E+01	.3074E+00	01	004
PD0495HR	071175	1504-1700	A062976CEC	0.437	.2067E+01	.3490E+00	01	004
PD0496HR	071175	1701-1900	A071276CEC	0.448	.1657E+01	.3137E+00	01	004
PD0497HR	071175	1902-2104	A071976CEC	0.456	.2027E+01	.3624E+00	01	004
PD0491HR	071175	0701-0902	A060376CEL	0.462	.2350E+02	.7311E+00	L6	004
PD0493HR	071175	0900-1102	A061076CEL	0.460	.2400E+02	.7428E+00	L6	004
PD0492HR	071175	1104-1305	A063076CEL	0.460	.1811E+02	.6130E+00	L6	004
PD0494HR	071175	1305-1500	A062276CEL	0.435	.2244E+02	.7252E+00	L6	004
PD0495HR	071175	1504-1700	A062776CEL	0.437	.2754E+02	.8333E+00	L6	004
PD0496HR	071175	1701-1900	A062776CEL	0.448	.2112E+02	.6347E+00	L6	004
PD0497HR	071175	1902-2104	A062776CEL	0.456	.2549E+02	.7738E+00	L6	004
PD0491HR	071175	0701-0902	A062776MCC	0.462	.1067E+02	.4201E+00	01	004
PD0493HR	071175	0900-1102	A070276MCC	0.460	.1025E+02	.4053E+00	01	004
PD0492HR	071175	1104-1306	A070676MCC	0.460	.9130E+01	.3785E+00	01	004
PD0494HR	071175	1306-1500	A071376MCC	0.435	.1026E+02	.4363E+00	01	004
PD0495HR	071175	1504-1700	A071376MCC	0.437	.1378E+02	.5171E+00	01	004
PD0496HR	071175	1701-1900	A071676MCC	0.448	.9151E+01	.3831E+00	01	004
PD0497HR	071175	1902-2104	A071976MCC	0.456	.1153E+02	.4440E+00	01	004

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---EPISODE D---

CD0302HR	071175	0700-0900	A062576BFC	0.415	.3398E+01	.4027E+00	01	001
CD0304HR	071175	0902-1100	A063076BFC	0.403	.4874E+01	.5768E+00	01	001
CD0305HR	071175	1102-1300	A070176BFC	0.401	.7379E+01	.8964E+00	01	001
CD0306HR	071175	1302-1500	A070876BFC	0.401	.3628E+01	.4259E+00	01	001
CD0307HR	071175	1502-1700	A071276BFC	0.403	.2800E+01	.3323E+00	01	001
CD0308HR	071175	1702-1900	A071576BFC	0.408	.2367E+01	.2913E+00	01	001
CD0309HR	071175	1903-2100	A071976BFC	0.405	.2740E+01	.3253E+00	01	001
CD0302HR	071175	0700-0900	A060776CEC	0.415	.3679E+01	.5017E+00	01	001
CD0304HR	071175	0902-1100	A061176CEC	0.403	.3264E+01	.5435E+00	01	001
CD0305HR	071175	1102-1300	A062276CEC	0.401	.5766E+01	.1066E+01	01	001
CD0306HR	071175	1302-1500	A062376CEC	0.401	.3899E+01	.6261E+00	01	001
CD0307HR	071175	1502-1700	A052776CEC	0.403	.1228E+01	.2765E+00	01	001
CD0308HR	071175	1702-1900	A071276CEC	0.408	.1323E+01	.2852E+00	01	001
CD0309HR	071175	1903-2100	A071976CEC	0.405	.1305E+01	.2909E+00	01	001
CD0302HR	071175	0700-0900	A070776CFL	0.415	.3335E+02	.5773E+00	L6	001
CD0304HR	071175	0902-1100	A070776CFL	0.403	.3336E+02	.1109E+01	L6	001
CD0305HR	071175	1102-1300	A071676CFL	0.401	.5304E+02	.1401E+01	L6	001
CD0306HR	071175	1302-1500	A072076CCL	0.401	.3667E+02	.1066E+01	L6	001
CD0307HR	071175	1502-1700	A072076CFL	0.403	.1900E+02	.6682E+00	L6	001
CD0308HR	071175	1702-1900	A072076CFL	0.408	.1321E+02	.6492E+00	L6	001
CD0309HR	071175	1903-2100	A072076CFL	0.405	.1873E+02	.6616E+00	L6	001
CD0302HR	071175	0700-0900	A052276MCC	0.415	.1534E+02	.5690E+00	01	001
CD0304HR	071175	0902-1100	A070276MCC	0.403	.1711E+02	.6255E+00	01	001
CD0305HR	071175	1102-1300	A070676MCC	0.401	.2405E+02	.8420E+00	01	001
CD0306HR	071175	1302-1500	A071376MCC	0.401	.1406E+02	.5625E+00	01	001
CD0307HR	071175	1502-1700	A071376MCC	0.403	.7373E+01	.3562E+00	01	001
CD0308HR	071175	1702-1900	A071676MCC	0.408	.6714E+01	.3391E+00	01	001
CD0309HR	071175	1903-2100	A071976MCC	0.405	.7131E+01	.3498E+00	01	001
PD0439HR	071175	0700-0900	A062576BEC	0.363	.6361E+01	.7527E+00	01	002
PD0440HR	071175	0902-1101	A063076BEC	0.355	.5123E+01	.6066E+00	01	002
PD0371HR	071175	1103-1300	A070176BEC	0.349	.9290E+01	.1097E+01	01	002
PD0372HR	071175	1301-1501	A070976BEC	0.353	.6242E+01	.7366E+00	01	002
PD0373HR	071175	1502-1700	A071276BEC	0.352	.3612E+01	.4283E+00	01	002
PD0374HR	071175	1701-1900	A071576BEC	0.354	.3795E+01	.4497E+00	01	002
PD0375HR	071175	1901-2101	A071976BEC	0.372	.4188E+01	.4961E+00	01	002
PD0439HR	071175	0700-0900	A060776CEC	0.363	.6649E+01	.1053E+01	01	002
PD0440HR	071175	0902-1101	A061176CEC	0.355	.5036E+01	.8113E+00	01	002
PD0371HR	071175	1103-1300	A062276CEC	0.349	.5815E+01	.9290E+00	01	002
PD0372HR	071175	1301-1501	A052376CEC	0.353	.3122E+01	.5782E+00	01	002
PD0373HR	071175	1502-1700	A062976CEC	0.352	.2543E+01	.4557E+00	01	002
PD0374HR	071175	1701-1900	A071276CEC	0.364	.2731E+01	.4775E+00	01	002
PD0375HR	071175	1901-2101	A071976CEC	0.372	.2806E+01	.4856E+00	01	002
PD0439HR	071175	0700-0900	A062476CEL	0.363	.5295E+02	.1481E+01	L6	002

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---EPISODE E---

CE0313HR	071275	0700-0900	A051876BEC	0.420	.1141E+01	.1378E+00	01	001
CE0314HR	071275	0902-1100	A051976BEC	0.410	.2005E+01	.2388E+00	01	001
CE0315HR	071275	1102-1300	A052176BEC	0.410	.1891E+01	.2254E+00	01	001
CE0316HR	071275	1302-1500	A060176BEC	0.410	.2538E+01	.3014E+00	01	001
CE0317HR	071275	1502-1700	A060276BEC	0.403	.2574E+01	.3058E+00	01	001
CE0318HR	071275	1702-1900	A061176BEC	0.403	.3239E+01	.3840E+00	01	001
CE0319HR	071275	1902-2100	A062376BEC	0.408	.1258E+01	.1516E+00	01	001
CE0313HR	071275	0700-0900	A051076CEC	0.420	.1123E+01	.2596E+00	01	001
CE0314HR	071275	0902-1100	A051276CEC	0.410	.1397E+01	.2928E+00	01	001
CE0315HR	071275	1102-1300	A051476CEC	0.410	.1877E+01	.3512E+00	01	001
CE0316HR	071275	1302-1500	A051876CEC	0.410	.2287E+01	.4052E+00	01	001
CE0317HR	071275	1502-1700	A052176CEC	0.403	.1624E+01	.3217E+00	01	001
CE0318HR	071275	1702-1900	A060376CEC	0.403	.1261E+01	.2801E+00	01	001
CE0319HR	071275	1902-2100	A060476CEC	0.408	.1097E+01	.2612E+00	01	001
CE0313HR	071275	0700-0900	A031876CEL	0.420	.1186E+02	.5270E+00	L6	001
CE0314HR	071275	0902-1100	A031876CEL	0.410	.2167E+02	.7181E+00	L6	001
CE0315HR	071275	1102-1300	A031876CEL	0.410	.2575E+02	.8066E+00	L6	001
CE0316HR	071275	1302-1500	A031876CEL	0.410	.2486E+02	.7868E+00	L6	001
CE0317HR	071275	1502-1700	A031976CEL	0.403	.1831E+02	.6557E+00	L6	001
CE0318HR	071275	1702-1900	A031976CEL	0.403	.1557E+02	.6033E+00	L6	001
CE0319HR	071275	1902-2100	A031976CEL	0.408	.1032E+02	.5145E+00	L6	001
CE0313HR	071275	0700-0900	A051976MCC	0.420	.5677E+01	.3115E+00	01	001
CE0314HR	071275	0902-1100	A052476MCC	0.410	.9870E+01	.4152E+00	01	001
CE0315HR	071275	1102-1300	A052476MCC	0.410	.1228E+02	.4813E+00	01	001
CE0316HR	071275	1302-1500	A060276MCC	0.410	.8038E+01	.3688E+00	01	001
CE0317HR	071275	1502-1700	A060376MCC	0.403	.6594E+01	.3388E+00	01	001
CE0318HR	071275	1702-1900	A061476MCC	0.403	.5565E+01	.3177E+00	01	001
CE0319HR	071275	1902-2100	A062576MCC	0.408	.3774E+01	.2842E+00	01	001
PE0377HR	071275	0700-0900	A051876BEC	0.372	.2788E+01	.3311E+00	01	002
PE0378HR	071275	0901-1100	A052176BEC	0.364	.3044E+01	.3613E+00	01	002
PE0379HR	071275	1102-1300	A052176BEC	0.356	.2894E+01	.3438E+00	01	002
PE0381HR	071275	1303-1501	A060176BEC	0.352	.2970E+01	.3527E+00	01	002
PE0382HR	071275	1502-1700	A060276BEC	0.351	.3233E+01	.3836E+00	01	002
PE0383HR	071275	1701-1900	A061176BEC	0.369	.1584E+01	.1900E+00	01	002
PE0384HR	071275	1902-2100	A062376BEC	0.366	.1753E+01	.2098E+00	01	002
PE0377HR	071275	0700-0900	A051076CEC	0.372	.2757E+01	.4789E+00	01	002
PE0378HR	071275	0901-1100	A051276CEC	0.364	.2500E+01	.4465E+00	01	002
PE0379HR	071275	1102-1300	A051476CEC	0.356	.2931E+01	.5073E+00	01	002
PE0381HR	071275	1303-1501	A051876CEC	0.352	.2050E+01	.3918E+00	01	002
PE0382HR	071275	1502-1700	A052476CEC	0.361	.2655E+01	.4681E+00	01	002
PE0383HR	071275	1701-1900	A060376CEC	0.369	.1081E+01	.2760E+00	01	002
PE0384HR	071275	1902-2100	A060476CEC	0.366	.1425E+01	.3124E+00	01	002
PE0377HR	071275	0700-0900	A021976CEL	0.372	.1956E+02	.7040E+00	L6	002

PE0378HR	071275	0901-1100	A022076CEL	0.364	.2713E+02	.8672E+00	L6	002
PE0379HR	071275	1102-1300	A022076CEL	0.357	.2966E+02	.9283E+00	L6	002
PE0381HR	071275	1303-1501	A022076CEL	0.352	.2631E+02	.8592E+00	L6	002
PE0382HR	071275	1502-1700	A022376CEL	0.361	.2014E+02	.7251E+00	L6	002
PE0383HR	071275	1701-1900	A022376CEL	0.369	.1442E+02	.6144E+00	L6	002
PE0384HR	071275	1902-2100	A022476CEL	0.366	.1555E+02	.6364E+00	L6	002

PE0377HR	071275	0700-0900	A051976MCC	0.372	.7809E+01	.3819E+00	01	002
PE0378HR	071275	0901-1100	A052476MCC	0.364	.1224E+02	.4978E+00	01	002
PE0379HR	071275	1102-1300	A052476MCC	0.356	.2003E+02	.7282E+00	01	002
PE0381HR	071275	1303-1501	A060276MCC	0.352	.1090E+02	.4680E+00	01	002
PE0382HR	071275	1502-1700	A060376MCC	0.361	.8048E+01	.3935E+00	01	002
PE0383HR	071275	1701-1900	A061476MCC	0.369	.4851E+01	.3250E+00	01	002
PE0384HR	071275	1902-2100	A062576MCC	0.366	.5959E+01	.3466E+00	01	002

RE0441HR	071275	0700-0900	A051876BEC	0.458	.2923E+01	.3465E+00	01	004
RE0443HR	071275	0901-1101	A052176BEC	0.470	.2658E+01	.3152E+00	01	004
RE0444HR	071275	1102-1300	A052176BEC	0.450	.1592E+01	.1900E+00	01	004
RE0445HR	071275	1301-1500	A060176BEC	0.466	.4029E+01	.4769E+00	01	004
RE0446HR	071275	1501-1700	A060276BEC	0.454	.2364E+01	.2806E+00	01	004
RE0447HR	071275	1700-1859	A061176BEC	0.454	.1157E+01	.1393E+00	01	004
RE0449HR	071275	1900-2100	A062376BEC	0.470	.1042E+01	.1258E+00	01	004

RE0441HR	071275	0700-0900	A051076CEC	0.458	.2890E+01	.4809E+00	01	004
RE0443HR	071275	0901-1101	A051276CEC	0.470	.2622E+01	.4411E+00	01	004
RE0444HR	071275	1102-1300	A051476CEC	0.450	.1528E+01	.2972E+00	01	004
RE0445HR	071275	1301-1500	A051876CEC	0.466	.1458E+01	.2847E+00	01	004
RE0446HR	071275	1501-1700	A052476CEC	0.454	.1326E+01	.2719E+00	01	004
RE0447HR	071275	1700-1859	A060376CEC	0.454	.8691E+00	.2234E+00	01	004
RE0449HR	071275	1900-2100	A060476CEC	0.470	.7135E+00	.2047E+00	01	004

RE0441HR	071275	0700-0900	A022676CEL	0.458	.2481E+02	.7616E+00	L6	004
RE0443HR	071275	0901-1101	A030576CEL	0.470	.2698E+02	.8066E+00	L6	004
RE0444HR	071275	1102-1300	A030876CEL	0.450	.2411E+02	.7494E+00	L6	004
RE0445HR	071275	1301-1500	A030876CEL	0.466	.2504E+02	.7634E+00	L6	004
RE0446HR	071275	1501-1700	A030876CEL	0.454	.2292E+02	.7212E+00	L6	004
RE0447HR	071275	1700-1859	A072076CEL	0.454	.1651E+02	.5363E+00	L1	004
RE0449HR	071275	1900-2100	A072076CEL	0.470	.1211E+02	.4958E+00	L1	004

RE0441HR	071275	0700-0900	A051976MCC	0.458	.1020E+02	.4086E+00	01	004
RE0443HR	071275	0901-1101	A052476MCC	0.470	.1552E+02	.5632E+00	01	004
RE0444HR	071275	1102-1300	A052576MCC	0.450	.1174E+02	.4541E+00	01	004
RE0445HR	071275	1301-1500	A060276MCC	0.466	.7757E+01	.3414E+00	01	004
RE0446HR	071275	1501-1700	A060376MCC	0.454	.7859E+01	.3478E+00	01	004
RE0447HR	071275	1700-1859	A061576MCC	0.454	.5459E+01	.2924E+00	01	004
RE0449HR	071275	1900-2100	A062576MCC	0.470	.5168E+01	.2803E+00	01	004

Appendix H

Glossary of Terms and Abbreviations

ACHEX - Aerosol Characterization Experiment

BEC - benzene extractable carbon

b_{scat} - light scattering coefficient

Cp - primary organic carbon

Cs - secondary organic carbon

Ce - elementary organic carbon

CEC - cyclohexane extractable carbon

CEL - total carbon (all forms)

GC-MS - gas chromatography - mass spectroscopy

MCC - methanol-chloroform extractable carbon

MSTA - mass spectrometric thermal analysis

PDT - pacific daylight time

PNA - polynuclear aromatic

TSP - total suspended particulate matter